IEc

ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION FOR THE SONOMA COUNTY DISTINCT POPULATION SEGMENT OF CALIFORNIA TIGER SALAMANDER

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prepared for:

U.S. Fish and Wildlife Service

4401 N. Fairfax Drive

Arlington, VA 22203

prepared by:

Industrial Economics, Incorporated

2067 Massachusetts Avenue

Cambridge, MA 02140

INDUSTRIAL ECONOMICS, INCORPORATED

TABLE OF CONTENTS

LIST OF ACRONYMS

ABAG	Association of Bay Area Governments
CEQA	California Environmental Quality Act
CHD	critical habitat designation
Conservation Strategy	Santa Rosa Plain Conservation Strategy
Corps	U.S. Army Corps of Engineers
CTIS	California Transportation Investment System
CTS	California tiger salamander
CWA	Clean Water Act
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
HCP	habitat conservation plan
IEc	Industrial Economics, Incorporated
MTC	Metropolitan Transportation Commission
OMB	U.S. Office of Management and Budget
PCEs	primary constituent elements
PG&E	Pacific Gas and Electric Company
Programmatic	Programmatic Biological Opinion for U.S. Army Corps-permitted projects
RFA	Regulatory Flexibility Act
SBA	Small Business Administration
SBREFA	Small Business Regulatory Enforcement Fairness Act
SCTA	Sonoma County Transportation Authority
Service	U.S. Fish and Wildlife Service
TIP	Transportation Improvement Program
UGBs	urban growth boundaries

EXECUTIVE SUMMARY

1. The purpose of this report is to identify and analyze the potential economic impacts associated with the designation of critical habitat for the Sonoma County distinct population segment of the California tiger salamander (hereafter "CTS"). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service (Service).

2. On August 18, 2009, the Service proposed critical habitat for the CTS, identifying approximately 74,223 acres within a single unit in the Santa Rosa Plain Region of Sonoma County, California.[1] The area proposed as CTS critical habitat was subsequently revised by the Service to be consistent with known CTS occurrence and the boundaries of the Santa Rosa Plain Conservation Strategy, increasing proposed critical habitat along its southeastern boundary to include an additional 305 acres.[2] Additionally, the Service removed proposed critical habitat areas deemed to no longer contain the primary constituent elements (PCEs) (areas within the Laguna de Santa Rosa 100-year floodplain and developed areas within urban growth boundaries), reducing proposed critical habitat by approximately 23,674 acres. Revised proposed critical habitat areas are presented in the NOA accompanying this report. In total, the Service is proposing to designate 50,854 acres as CTS critical habitat (approximately 23,369 acres less than the area proposed in 2009). This analysis considers the economic effects of designating the proposed revised critical habitat as presented in the NOA (the study area for this analysis). Exhibit ES-1 presents the differences between the area proposed as critical habitat in the 2009 Proposed Rule and the revised area proposed in the NOA.

3. The proposed revised critical habitat unit consists of 965 acres of State lands (756 acres California Determent of Fish and Game and 209 acres State Commission lands), 87 acres of County Regional Park lands, 223 acres of Sonoma County Agricultural Preservation and Open Space District Land, 1,109 acres of other local ownership, and 48,469 acres of private lands.[3] Exhibit ES-2 provides an overview of currently proposed critical habitat for the CTS.

[1] 74 FR 41662.

[2] Written communication from the Service on August 5, 2010 and review of the revised proposed critical habitat shapefile received from the Service on August 9, 2010.

[3] Based on GIS analysis using the following datasets: 1) U.S. Fish and Wildlife Service. 2010. ctssrp_pCH_070510 (vector digital data). Received from the Service on August 9, 2010; and, 2) GreenInfo Network. 2010. California Protected Areas Database (CPAD) Version 1.4. Purchased online at http://www.calands.org.

EXHIBIT ES-1 PROPOSED REVISED CRITICAL HABITAT IN RELATION TO PROPOSED CRITICAL HABITAT INCLUDED IN THE 2009 PROPOSED RULE

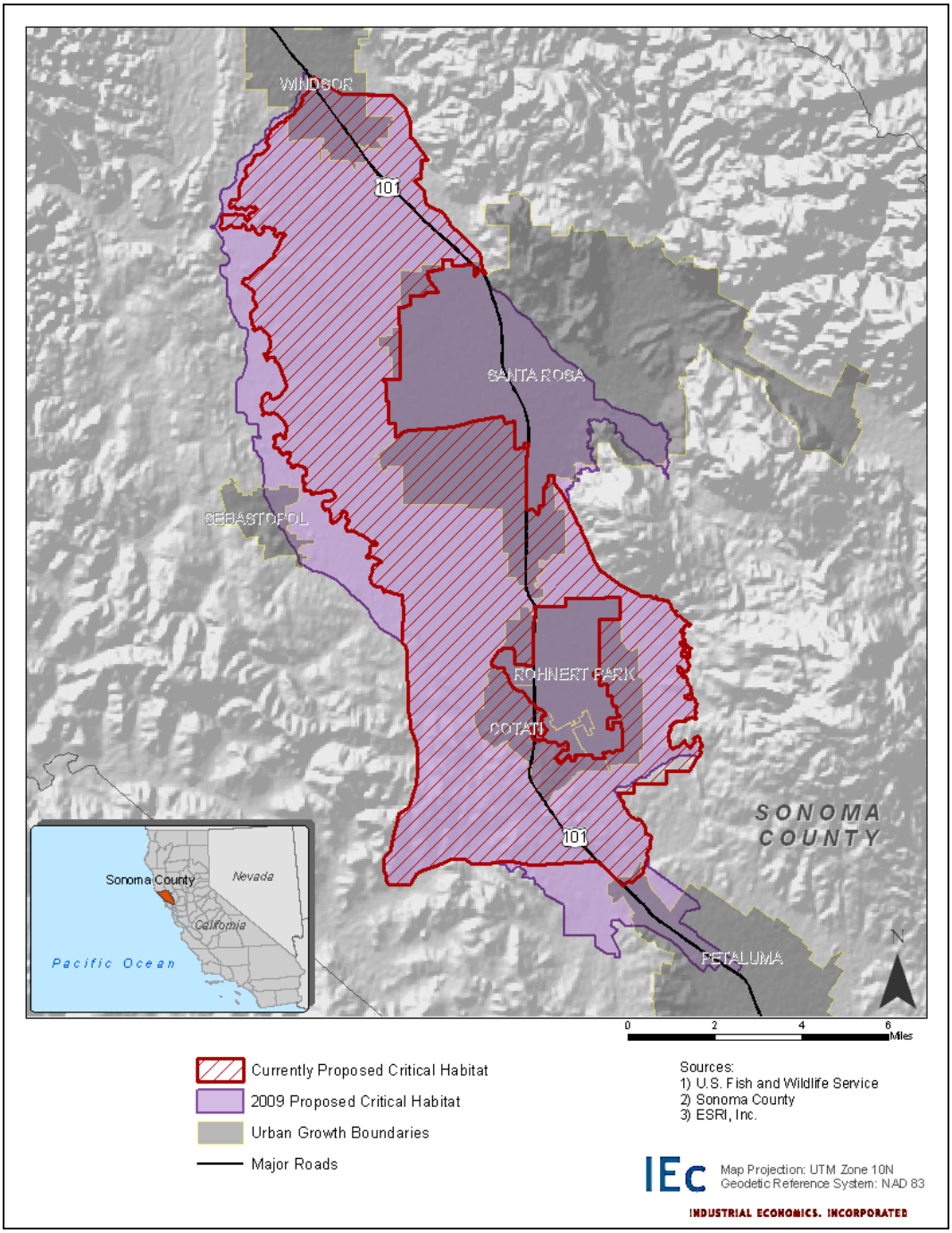
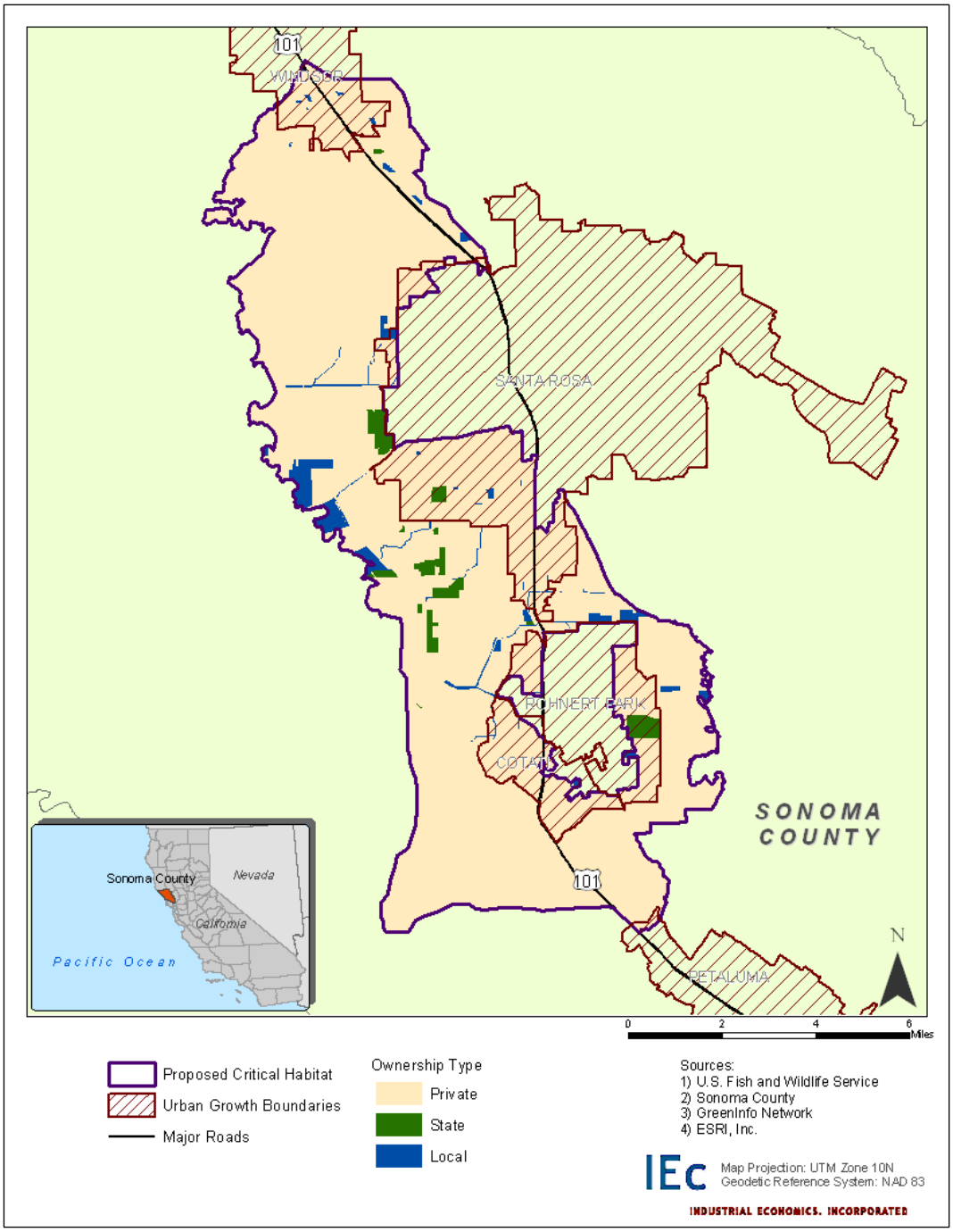


EXHIBIT ES-2 OVERVIEW PROPOSED REVISED CRITICAL HABITAT FOR CTS



FOCUS OF THE ECONOMIC ANALYSIS

4. This analysis describes economic impacts to commercial and residential development, transportation projects, and utility/pipeline activities associated with designation of critical habitat for the CTS. Additionally, this analysis addresses potential economic impacts to agriculture and mitigation bank management, but concludes that these activities are not likely to incur measurable economic impacts due to the designation of critical habitat.

5. To provide an understanding of the potential economic impacts, this analysis: 1) determines the scope and scale of economic activities within proposed critical habitat; 2) identifies threats to CTS habitat associated with these economic activities; 3) identifies conservation measures that may be implemented to avoid or minimize these threats; and, 4) to the extent feasible, quantifies the economic costs of these measures.

6. The analysis separates conservation measures into two distinct categories according to "without critical habitat" and "with critical habitat" scenarios. The "without critical habitat" scenario represents the baseline for the analysis, considering protections otherwise afforded to the CTS; for example, under other Federal, State, and local regulations. The "with critical habitat" scenario describes the incremental impacts specifically due to designation of critical habitat for the species. In other words, these incremental conservation measures and associated economic impacts would not occur but for the designation. Economic impacts are only quantified for conservation measures implemented specifically due to the designation of critical habitat (i.e., incremental impacts). Conservation measures implemented under the baseline (without critical habitat) scenario are described qualitatively within the report, but economic impacts associated with these measures are not quantified.

7. This analysis considers both direct and indirect costs. Indirect costs, for example, may result from the influence of critical habitat designation on the decisions of regulators and decision-makers other than the Service (e.g., State agencies and land managers).

8. Because the Service believes that the direct benefits of the Proposed Rule are best expressed in biological terms, this analysis does not quantify or monetize benefits. However, a qualitative discussion of potential categories of economic benefits is provided in Chapter 5.

SUMMARY OF FINDINGS

9. The following points summarize the key issues and conclusions of this report:

- **Incremental impacts stem entirely from the administrative cost of section 7 consultation:** Present value incremental impacts of CTS conservation are estimated to be $482,000, equivalent to $41,400 in annualized impacts over the analysis timeframe (2011 to 2035, applying a seven percent discount rate). All of these impacts stem from the additional administrative cost of addressing adverse modification of critical habitat during section 7 consultation. Incremental impacts stemming from additional CTS conservation measures requested by the

Service during section 7 consultation specifically to avoid adverse modification of critical habitat, although possible, are considered unlikely.

The Service notes that additional conservation measures stemming from the designation of critical habitat will only be requested when an adverse modification determination is reached.[4] If the CTS is known or assumed to occur within a project area, then an adverse modification finding will be coincident with a jeopardy finding and any additional conservation measures requested are attributable to the presence of the species as well as critical habitat.[5] That is, the same conservation measures would be requested absent critical habitat, and as such, the costs of these measures are considered baseline. The CTS is expected to be present or assumed to be present in the majority of projects (85 percent) within areas where CTS presence is known to be relatively high (roughly 57 percent of areas within proposed critical habitat where impacts to CTS and its habitat are possible, i.e., non-hardscape areas).

Given that an adverse modification determination will be coincident with a jeopardy determination if the CTS is present, projects resulting in a jeopardy determination are expected to be similar in nature to projects resulting in an adverse modification determination where the CTS is absent. Further, similar conservation measures are expected to be requested to avoid adverse modification as are requested to avoid jeopardy. To date, the Service has not reached a jeopardy finding for any project within the study area.[6] Therefore, it is difficult to predict the types of projects that might lead to an adverse modification determination in the future or the specific conservation measures that may be requested is such cases.[7,8] Given, a) the significant uncertainty regarding the types of projects that might lead to an adverse modification finding in the future and the conservation measures that may be requested to avoid adverse modification; and, b) the lack of precedent for the Service to request additional conservation measures to avoid jeopardy; this analysis does not forecast incremental impacts stemming from conservation measures implemented to avoid adverse modification of CTS critical habitat.

- **The majority of incremental impacts are to development activities:** Chapter 3 describes forecast incremental impacts to development activities. The present value of incremental impacts to development is estimated to be $441,000, or

[4] Personal communication with the Service on July 20, 2010.

[5] U.S. Fish and Wildlife Service to Industrial Economics, Incorporated. August 4, 2010. "Comments on how the Draft Economic Analysis Should Estimate Incremental Costs for the California Tiger Salamander (*Ambystoma californiense*), Sonoma Distinct Population Segment, Re-proposed Critical Habitat Designation."

[6] Based on review of section 7 consultation history from 2004 to 2010; and, personal communication with the Service on July 20, 2010.

[7] U.S. Fish and Wildlife Service to Industrial Economics, Incorporated. August 4, 2010. "Comments on how the Draft Economic Analysis Should Estimate Incremental Costs for the California Tiger Salamander (*Ambystoma californiense*), Sonoma Distinct Population Segment, Re-proposed Critical Habitat Designation."

[8] The Service does note that, in general, conservation measures would likely: modify the project so that a lower level of land use occurred; or, relocate the project to avoid suitable wetland and associated upland areas.

$37,900 annualized over the analysis timeframe (2011 to 2035, applying a seven percent discount rate). Impacts to development represent roughly 92 percent of overall incremental impacts (discounted at seven percent). As described above, all incremental impacts to development are due to the administrative cost of addressing adverse modification in section 7 consultation. All forecast development projects are expected to require section 7 consultation due to the need for a section 404 permit pursuant to the Clean Water Act (CWA). In total, roughly eight development projects are forecast to occur annually within the study area. The majority of future development projects (seven projects annually) are forecast to occur within the five urban growth boundaries intersecting proposed critical habitat (Cotati, Petaluma, Rohnert Park, Santa Rosa, and Windsor).

- **The existing programmatic section 7 consultation for U.S. Army Corps permitted projects will be reinitiated resulting in incremental impacts:** Nearly all future section 7 consultations forecast to occur within the study area over the analysis timeframe are expected to be triggered by the need for a section 404 permit from the U.S. Army Corps of Engineers (the Corps) pursuant to the CWA. In 2007, the Corps completed a programmatic section 7 consultation with the Service covering all Corps permitted projects that may affect the CTS and three endangered plant species on the Santa Rosa Plain (hereafter referred to as the "Programmatic"). The existence of the Programmatic allows project proponents requiring section 404 permits to append their projects to the Programmatic (as long at the project meets defined criteria), thereby streamlining the section 7 consultation process.

  Following the designation of critical habitat for the CTS, the Programmatic will be reinitiated to address the potential adverse modification of CTS critical habitat. The Service expects the Programmatic to be reinitiated within a year following the final designation of critical habitat.[9] The present value cost of reinitiating the Programmatic following critical habitat designation is estimated to be $16,900 applying a seven percent discount rate. All of these costs are incremental as the reinitiation of the Programmatic would not take place without the designation of critical habitat for the CTS.

- **Remaining incremental impacts are to transportation and utility activities:** Incremental impacts to transportation and utility activities are described in Chapter 4. As described above, incremental impacts to transportation and utilities stem entirely from the administrative cost of addressing adverse modification during section 7 consultation. Transportation and utility projects are expected to require section 7 consultation due to the need for a section 404 permit pursuant to the CWA.

  The present value of impacts to transportation incurred between 2011 and 2035 is estimated to equal $22,500, or $1,930 annualized (applying a seven percent

[9] Written communication with the Service on October 19, 2010.

discount rate). Impacts are due to two CALTRANS projects requiring re-initiation of section 7 consultation following the designation of critical habitat; and two new section 7 consultations: one for the construction of a new bridge in Santa Rosa by CALTRANS, and another for the construction of pedestrian linkages along the Old Redwood Highway by the Town of Windsor.

Incremental administrative costs to utility activities stem entirely from an intra-Service section 7 consultation for a habitat conservation plan (HCP) to be submitted by the Pacific Gas and Electric Company (PG&E) in 2011. The present value administrative cost of this consultation is $1,290 (applying a seven percent discount rate).

- **Two economic activities considered in the economic analysis are not forecast to incur incremental impacts:** This analysis considers potential impacts to agriculture and mitigation bank development, but does not quantify incremental impacts to either activity as described in Chapter 4. Agricultural activities are identified as a threat to CTS in the Proposed Rule; however, the majority of agricultural activity is not subject to a Federal nexus requiring consultation with the Service. Those agricultural activities that are not exempt (i.e., ground disturbing activities such as vineyard conversion) are not forecast to occur within proposed critical habitat during the analysis timeframe.[10]

  Mitigation bank development may require section 7 consultation if it involves wetland restoration activities requiring a 404 permit pursuant to the CWA. However, the Service indicates that there are no additional administrative costs associated with addressing adverse modification in section 7 consultations for new mitigation bank development, as ultimately, the establishment of a new bank will benefit the species.[11]

INCREMENTAL IMPACTS OF CTS CONSERVATION

10. Exhibit ES-3 summarizes incremental impacts of CTS conservation over the next 25 years (2011 to 2035) by urban area (areas within urban growth boundaries (UGBs)) and non-urban areas (areas outside UGBs). To calculate present value and annualized impacts, guidance provided by U.S. Office of Management and Budget (OMB) specifies the use of a real annual discount rate of seven percent.[12] In addition, OMB recommends

[10] The section 7 consultation history contains no past consultations for ground disturbing agricultural projects. Further, communication with the Corps Regulatory Division indicates that no section 404 permit requests for agricultural conversion (including vineyard conversion) projects have occurred in the recent past within the study area.

[11] Personal communication with the Service on September 14, 2010.

[12] "A real discount rate that has been adjusted to eliminate the effect of expected inflation should be used to discount constant-dollar or real benefits and costs. A real discount rate can be approximated by subtracting expected inflation from a nominal interest rate… Constant-dollar benefit-cost analyses of proposed investments and regulations should report net present value and other outcomes determined using a real discount rate of 7 percent. This rate approximates the marginal pretax rate of return on an average investment in the private sector in recent years." U.S. Office of Management and Budget, Circular A-94 Revised, October 29, 1992.

conducting a sensitivity analysis using other discount rates, such as three percent.[13] Accordingly, all cost figures presented in Chapters 3 and 4 of this analysis describe present value cost impacts assuming a seven percent discount rate. Appendix B reports forecast impacts assuming a discount rate of three percent to highlight the sensitivity of the results to the discount rate assumption.

EXHIBIT ES-3 PRESENT VALUE AND ANNUALIZED INCREMENTAL IMPACTS OF CTS CONSERVATION BY URBAN AREA (2011 – 2035, 2010 DOLLARS)

REGION	THREE PERCENT DISCOUNT RATE		SEVEN PERCENT DISCOUNT RATE	
	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
Cotati	$22,700	$1,300	$17,400	$1,490
Petaluma	$14,300	$820	$10,100	$867
Rohnert Park	$33,700	$1,940	$23,300	$2,000
Santa Rosa	$311,000	$17,900	$210,000	$18,100
Windsor	$203,000	$11,700	$137,000	$11,700
Outside UGB	$117,000	$6,710	$84,200	$7,220
Total	**$702,000**	**$40,300**	**$482,000**	**$41,400**
Note: Totals may not sum due to rounding.				

11. The present value of total incremental impacts is forecast to be $482,000 (applying a seven percent discount rate). This equates to $41,400 in annualized impacts (applying a seven percent discount rate). All incremental impacts stem from the administrative costs associated with addressing adverse modification in future section 7 consultations.

12. The greatest incremental impacts are forecast to occur within the Santa Rosa UGB where present value impacts are equal to $210,000 (44 percent of overall incremental impacts), applying a seven percent discount rate. The second largest incremental impacts are forecast to occur within the Windsor UGB with present value impacts equal to $137,000 (28 percent of overall incremental impacts), applying a seven percent discount rate. Petaluma is forecast to incur the least incremental impact (present value impacts equal $10,100 discounted at seven percent, two percent of overall incremental impacts). As described above, impacts to development represent the majority of incremental impacts. Thus, the distribution of incremental impacts across the urban areas considered in the analysis is directly related to the level of forecast development within these areas. As reported in section 3.1.2, most development is forecast to occur within the Santa Rosa and Windsor UGBs (3.86 and 1.49 development projects annually, respectively). While the least amount of development is forecast to occur within the Petaluma UGB (0.15 development projects annually); only a small portion of the Petaluma UGB intersects the study area.

[13] U.S. Office of Management and Budget, Circular A-4, September 17, 2003 and U.S. Office of Management and Budget, "Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations; Notice," 68 Federal Register 5492, February 3, 2003.

13. Exhibit ES-4 presents present value and annualized incremental impacts by activity. As noted previously, impacts to development represent the majority (92 percent) of total incremental impacts with a present value of $441,000 (applying a seven percent discount rate). Incremental impacts to transportation ($22,500 or five percent of total incremental impacts) represent the next largest source of incremental impact. The present value cost of reinitiating the Programmatic to address adverse modification represents roughly four percent of total incremental impacts ($16,900) applying a seven percent discount rate. Utility activities are forecast to incur the smallest incremental impacts (present value impacts equal $1,290 or less than one percent of overall incremental impacts).

EXHIBIT ES-4 PRESENT VALUE AND ANNUALIZED INCREMENTAL IMPACTS OF CTS CONSERVATION BY ACTIVITY (2011 – 2035, 7 PERCENT DISCOUNT RATE, 2010 DOLLARS)

ACTIVITY	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
Development	$441,000	$37,900
Transportation	$22,500	$1,930
Reinitiation of Programmatic	$16,900	$1,450
Utilities	$1,290	$110
Total	**$482,000**	**$41,400**
Note: Totals may not sum due to rounding.		

KEY SOURCES OF UNCERTAINTY

- **Potential for additional conservation measures:** The most significant source of uncertainty in this analysis is the potential for the Service to request additional conservation measures specifically to avoid adverse modification in future section 7 consultations. Given significant uncertainty regarding the likelihood that the Service requires such measures in the future and what such measures might include, this analysis does not forecast incremental impacts stemming from additional conservation measures requested to avoid adverse modification of critical habitat. Rather, all incremental impacts are due to the additional administrative cost of addressing adverse modification during section 7 consultation. To the extent that the Service does request additional conservation measures to avoid adverse modification of critical habitat as part of consultations on future projects, this analysis underestimates incremental impacts.

- **Forecast development:** As described in Chapter 3, this analysis relies on development projections assembled by the Association of Bay Area Governments (ABAG) as well as local zoning data to forecast future development.[14] Forecast development is based on several assumptions including: 1) future development will increase to meet current projections despite the recent economic downturn; 2) developable areas within UGBs will be fully built out before any development occurs

[14] In some cases (i.e., Cotati, Petaluma, and Windsor) digital zoning data was not available, so paper zoning maps were digitized into GIS.

outside of UGBs; and 3) development will occur equally across the analysis timeframe (2011 to 2035) and developable areas within the study area. To the extent that these assumptions are inaccurate, actual future development may differ from forecast development reported in Chapter 3.

CHAPTER 1 | INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

1. This chapter provides a brief introduction to proposed critical habitat for the CTS. It includes a summary of past publications and legal actions that relate to the current proposal, a summary of the proposed revised critical habitat designation including a map of the area, and a summary of threats to the proposed critical habitat. This information is intended to provide background information. All official definitions and boundaries should be taken from the NOA accompanying this report.

1.2 PREVIOUS FEDERAL ACTIONS

2. On August 2, 2005, the Service published a Proposed Rule to designate approximately 74,223 acres of critical habitat; and on November 17, 2005, a revised Proposed Rule was published indicating consideration of approximately 21,298 acres for the final designation.[15,16] On December 14, 2005, the Service published a final rule, which excluded all proposed critical habitat, resulting in a designation of zero acres.[17] In response to a notice of intent to sue from the Center for Biological Diversity, on May 5, 2009 the Service agreed to publish a revised Proposed Rule that encompasses the same geographic areas as the August 2005 proposal. The August 18, 2009 revised Proposed Rule designating 74,223 acres of critical habitat complies with this agreement.[18]

3. The Service subsequently revised the area proposed as critical habitat in the 2009 Proposed Rule to be consistent with known CTS occurrence and the boundaries of the Santa Rosa Plain Conservation Strategy (hereafter "Conservation Strategy"), increasing proposed critical habitat along its southeastern boundary to include an additional 305 acres.[19] Additionally, the Service removed proposed critical habitat areas deemed to no longer contain the primary constituent elements (PCEs) (areas within the Laguna de Santa Rosa 100-year floodplain and developed areas within urban growth boundaries), reducing proposed critical habitat by approximately 23,674 acres. The revised proposed critical habitat area is presented in the NOA accompanying this report. In total, the Service is proposing to designate 50,854 acres as CTS critical habitat organized in a single unit

[15] 70 FR 44301.

[16] 70 FR 69717.

[17] 70 FR 74138.

[18] 74 FR 41662.

[19] Written communication from the Service on August 5, 2010 and review of the revised proposed critical habitat shapefile received from the Service on August 9, 2010.

(approximately 23,369 acres less than the areas proposed as critical habitat in the 2009 Proposed Rule). The study area for this analysis is the 50,854-acre revised proposed critical habitat area. Exhibit 1-1 illustrates the differences between the proposed revised critical habitat area and the proposed critical habitat area included in the 2009 Proposed Rule.

1.3 PROPOSED REVISED CRITICAL HABITAT DESIGNATION

4. The proposed revised critical habitat designation consists of a single unit of critical habitat in the Santa Rosa Plain Region of Sonoma County, California. The unit is 50,854 acres in size and consists of 965 acres of State lands (756 acres California Determent of Fish and Game and 209 acres State Commission lands), 87 acres of County Regional Park lands, 223 acres of Sonoma County Agricultural Preservation and Open Space District Land, 1,109 acres of other local ownership, and 48,469 acres of private lands.[20] All lands proposed for designation as critical habitat are within the geographic area occupied by the species.[21] Exhibit 1-2 provides a detailed map of the proposed revised critical habitat area.

[20] Based on GIS analysis using the following datasets: 1) U.S. Fish and Wildlife Service. 2010. ctssrp_pCH_070510 (vector digital data). Received from the Service on August 9, 2010; and, 2) GreenInfo Network. 2010. California Protected Areas Database (CPAD) Version 1.4. Purchased online at http://www.calands.org.

[21] 74 FR 41668.

EXHIBIT 1-1 PROPOSED REVISED CRITICAL HABITAT IN RELATION TO 2009 PROPOSED CRITICAL HABITAT

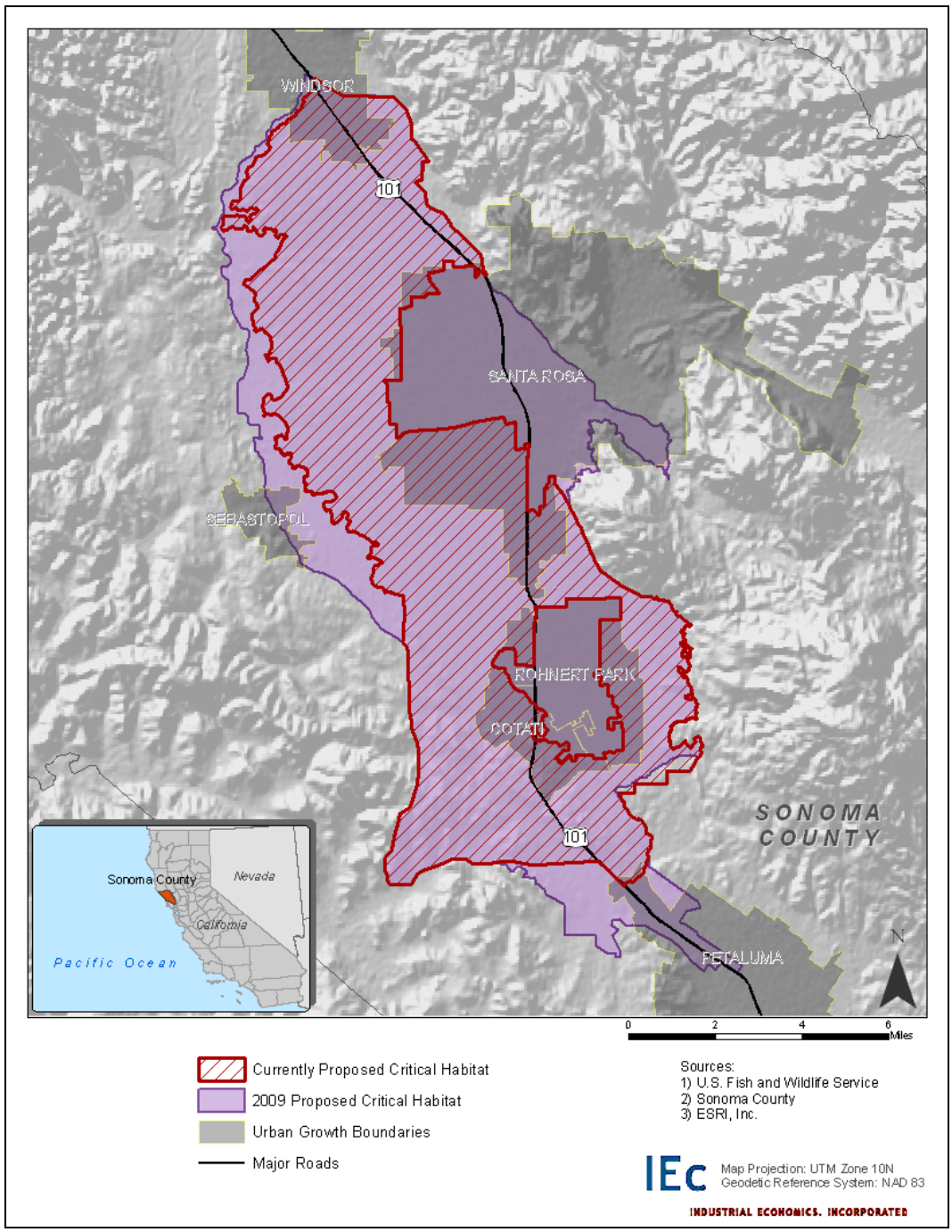
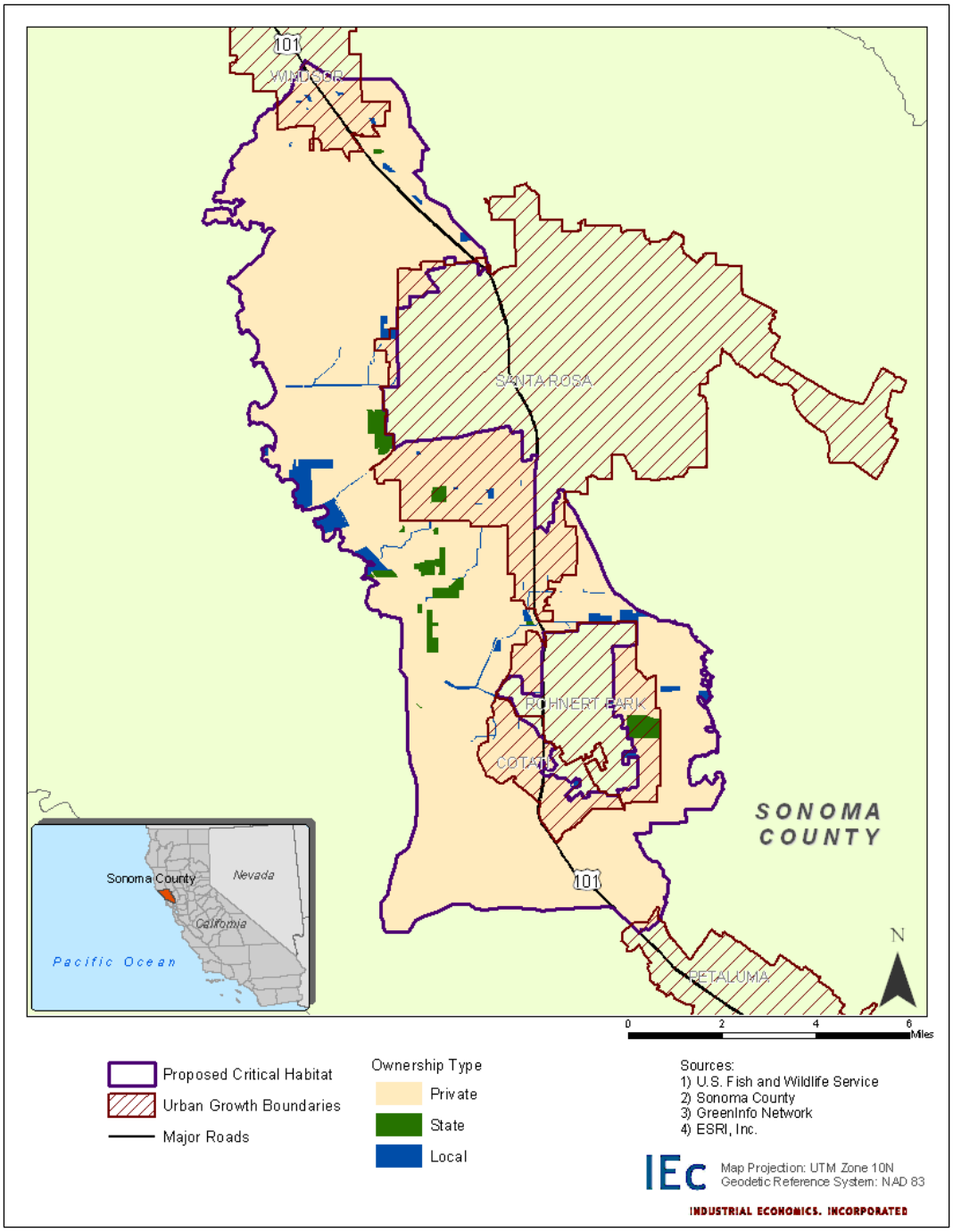


EXHIBIT 1-2 OVERVIEW PROPOSED CRITICAL HABITAT FOR CTS



1.4 ECONOMIC ACTIVITIES CONSIDERED IN THIS ANALYSIS

5. Review of the Proposed Rule and the consultation history identified the following economic activities as being potentially affected by conservation efforts for the CTS and its habitat. Each of the following economic activities is addressed in Chapters 3 and 4 of the economic analysis.

- **Residential and Commercial Development.** The Proposed Rule identifies construction of new structures as an activity that could significantly compromise the function of vernal pools, swales, ponds, and other seasonal wetlands, thereby: destroying CTS breeding sites, reducing the hydrological regime necessary for successful larval metamorphosis, and/or eliminating or reducing the habitat necessary for CTS growth and reproduction. [22] Construction of new structures could also significantly fragment and isolate aquatic and upland habitat preventing CTS dispersal to upland habitat or vise versa.[23] Chapter 3 considers the potential impact of CTS conservation on development activities on private lands.
- **Transportation.** According to the Proposed Rule, road construction could impact the CTS and its habitat in a manner similar to that of development – compromising the function of wetlands utilized by the CTS as well as fragmenting and isolating aquatic and upland habitat.[24] Chapter 4 of this analysis discusses potential impacts of CTS conservation activities on future transportation activities undertaken by CALTRANS.
- **Utility Activities.** Utility activities frequently include ground disturbing activities that may affect aquatic habitats. As such, they are considered a threat to the CTS and its habitat.[25] Chapter 4 discusses utility construction and maintenance activities carried out by PG&E.
- **Agriculture.** Agricultural projects involving ground disturbing activities may impact the CTS and its habitat. The 2009 Proposed Rule identifies vineyard conversion, in particular, as a threat to the CTS and its habitat because it frequently requires disking, grading, and water diversion that could compromise the function of vernal pools and other wetland habitats.[26] Potential effects of the designation of critical habitat for the CTS on agricultural activities within the study are discussed in Chapter 4.
- **Mitigation Bank Development.** Mitigation banks ultimately benefit the CTS by preserving its habitat. However, mitigation bank establishment frequently requires wetland restoration activities including digging and grading wetland

[22] 74 FR 41668.

[23] *Ibid*.

[24] *Ibid*.

[25] *Ibid*.

[26] *Ibid*.

areas.[27] The establishment of mitigation banks, therefore, may temporarily impact the CTS and its habitat. Potential impacts to mitigation bank development stemming from the designation of CTS critical habitat are discussed in Chapter 4.

1.5 ORGANIZATION OF THE REPORT

6. The remainder of this report is organized as follows: Chapter 2 discusses the framework employed in the analysis. Chapters 3 and 4 cover the assessment of potential economic impacts, organized by economic activity. Chapter 5 briefly describes the potential ancillary benefits of the critical habitat designation.

- Chapter 2 – Framework for the Analysis;
- Chapter 3 – Residential and Commercial Development;
- Chapter 4 – Other Activities (including transportation, utilities, agriculture, and mitigation bank development);
- Chapter 5 – Economic Benefits.

7. In addition, the report includes four appendices: Appendix A, which considers potential impacts on small entities and the energy industry; Appendices B and C, which provide information on the sensitivity of the economic impact estimates to alternative discount rates; and Appendix D, which provides the Service's incremental effects memorandum to IEc.

[27] Based on review of CTS section 7 consultation history from 2004 to 2010.

CHAPTER 2 | FRAMEWORK FOR THE ANALYSIS

8. The purpose of this report is to estimate the economic impact of actions taken to protect the CTS and its habitat. This analysis examines the impacts of restricting or modifying specific land uses or activities for the benefit of the species and its habitat within the proposed revised critical habitat area. This analysis employs "without critical habitat" and "with critical habitat" scenarios. The "without critical habitat" scenario represents the baseline for the analysis, considering protections otherwise afforded to the CTS; for example, under the Federal listing and other Federal, State, and local regulations. The "with critical habitat" scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat for the CTS. The analysis forecasts both baseline and incremental impacts likely to occur after the proposed critical habitat is finalized (post-designation impacts).

9. As described in Chapter 1, the proposed revised critical habitat area loosely follows the area proposed in the 2009 Proposed Rule which matches the area proposed as critical habitat in 2005. Major differences in proposed revised critical habitat include the addition of 305 acres along the southeastern boundary of the previously proposed area and the exclusion of 23,674 acres within the Laguna de Santa Rosa 100-year floodplain and developed areas within urban growth boundaries (see Exhibit 1-1). Despite the similarities in proposed revised critical habitat and the area proposed as critical habitat in 2005, this analysis differs from the approach followed in the 2005 analysis. Exhibit 2-1 summarizes how this analysis reflects new information and analytical approaches that the Service has provided or adopted since the 2005 proposed rule.

10. This information is intended to assist the Secretary of the DOI in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.[28] In addition, this information allows the Service to address the requirements of Executive Orders 12866 and 13211, and the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).[29]

[28] 16 U.S.C. §1533(b)(2).

[29] Executive Order 12866, Regulatory Planning and Review, September 30, 1993; Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001; 5. U.S.C. §§601 *et seq*; and Pub Law No. 104-121.

EXHIBIT 2-1 CHANGES IN ANALYTICAL APPROACH FROM THE ECONOMIC ANALYSIS PREPARED IN SUPPORT OF THE 2005 PROPOSED RULE

CHANGE IN ANALYTICAL APPROACH
• The Service now distinguishes the *incremental* costs of designation from baseline costs. The previous economic analysis evaluated all co-extensive costs (i.e., those resulting from both species listing (jeopardy) and critical habitat designation (adverse modification). Thus, this analysis characterizes all projected costs as either baseline costs (i.e., those impacts expected to occur absent the designation of critical habitat) or incremental costs (i.e., those impacts expected to occur as a result of critical habitat designation); • The Service provides guidance on distinguishing the incremental costs of the designation, as described in Section 2.3.2 of this report; and, • This analysis considers and estimates the impacts of the rule as currently proposed and as if the existing 2005 critical habitat designation does not exist. In other words, this analysis considers and estimates the impacts associated with designating areas as critical habitat versus not designating these areas. This analysis is intended to assist the Secretary of the DOI in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation. These particular areas also include those already designated as critical habitat under the 2005 designation and subject to re-examination by the Secretary. As a result, costs incurred as a result of the 2005 designation are not included or documented in this analysis.

11. This chapter describes the framework for this analysis. First, it describes the case law that led to the selection of the framework applied in this report. It then describes in economic terms the general categories of economic effects that are the focus of regulatory impact analysis, including a discussion of both efficiency and distributional effects. Next, this chapter defines the analytic framework used to measure these impacts in the context of critical habitat regulation and the consideration of benefits. It concludes with a presentation of the information sources relied upon in the analysis.

2.1 BACKGROUND

12. OMB's guidelines for conducting economic analyses of regulations direct Federal agencies to measure the costs of a regulatory action against a baseline, which it defines as the "best assessment of the way the world would look absent the proposed action."[30] In other words, the baseline includes the existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users potentially affected by the designation of critical habitat. Impacts that are incremental to that baseline (i.e.,

[30]U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf.

occurring over and above existing constraints) are attributable to the proposed regulation. Significant debate has occurred regarding whether assessing the impacts of the Service's proposed regulations using this baseline approach is appropriate in the context of critical habitat designations.

13. In 2001, the U.S. Tenth Circuit Court of Appeals instructed the Service to conduct a full analysis of all of the economic impacts of proposed critical habitat, regardless of whether those impacts are attributable co-extensively to other causes.[31] Specifically, the court stated,

> "The statutory language is plain in requiring some kind of consideration of economic impact in the CHD [critical habitat designation] phase. Although 50 C.F.R. 402.02 is not at issue here, the regulation's definition of the jeopardy standard as fully encompassing the adverse modification standard renders any purported economic analysis done utilizing the baseline approach virtually meaningless. We are compelled by the canons of statutory interpretation to give some effect to the congressional directive that economic impacts be considered at the time of critical habitat designation…. Because economic analysis done using the FWS's [Fish and Wildlife Service's] baseline model is rendered essentially without meaning by 50 C.F.R. § 402.02, we conclude Congress intended that the FWS conduct a full analysis of all of the economic impacts of a critical habitat designation, regardless of whether those impacts are attributable co-extensively to other causes. Thus, we hold the baseline approach to economic analysis is not in accord with the language or intent of the ESA [Endangered Species Act]."[32]

14. Since that decision, however, courts in other cases have held that an incremental analysis of impacts stemming solely from the critical habitat rulemaking is proper.[33] For example, in the March 2006 ruling that the August 2004 critical habitat rule for the Peirson's milk-vetch was arbitrary and capricious, the United States District Court for the Northern District of California stated,

> "The Court is not persuaded by the reasoning of *New Mexico Cattle Growers*, and instead agrees with the reasoning and holding of *Cape Hatteras Access Preservation Alliance v. U.S. Dep't of the Interior,* 344 F. Supp 2d 108 (D.D.C. 2004). That case also involved a challenge to the Service's baseline approach and the court held that the baseline approach was both consistent with the language and purpose of the ESA and that it was a reasonable method for assessing the actual costs of a particular critical habitat designation *Id* at 130. 'To find the true cost of a

[31] *New Mexico Cattle Growers Assn v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

[32] *Ibid.*

[33] *Cape Hatteras Access Preservation Alliance v. Department of Interior,* 344 F. Supp. 2d 108 (D.D.C.); *Center for Biological Diversity v. United States Bureau of Land Management*, 422 F. Supp. 2d 1115 (N.D. Cal. 2006).

designation, the world with the designation must be compared to the world without it.'"[34]

15. In order to address the divergent opinions of the courts and provide the most complete information to decision-makers, this economic analysis reports both:

    a. The baseline impacts of CTS conservation from protections afforded the species absent critical habitat designation; and

    b. The estimated incremental impacts precipitated specifically by the designation of critical habitat for the species.

16. Incremental effects of critical habitat designation are determined using the Service's December 9, 2004 interim guidance on "Application of the 'Destruction or Adverse Modification' Standard Under Section 7(a)(2) of the Endangered Species Act" and information from the Service regarding what potential consultations and project modifications may be imposed as a result of critical habitat designation over and above those associated with the listing.[35] Specifically, in *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, the Ninth Circuit invalidated the Service's regulation defining destruction or adverse modification of critical habitat, and the Service no longer relies on this regulatory definition when analyzing whether an action is likely to destroy or adversely modify critical habitat.[36] Under the statutory provisions of the Act, the Service determines destruction or adverse modification on the basis of whether, with implementation of the proposed Federal action, the affected critical habitat would remain functional to serve its intended conservation role for the species. A detailed description of the methodology used to define baseline and incremental impacts is provided later in this chapter.

2.2 CATEGORIES OF POTENTIAL ECONOMIC EFFECTS OF SPECIES CONSERVATION

17. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect the CTS and its habitat (hereinafter referred to collectively as "CTS conservation efforts"). Economic efficiency effects generally reflect "opportunity costs" associated with the commitment of resources required to accomplish species and habitat conservation. For example, if the set of activities that may take place on a parcel of land is limited as a result of the designation or the presence of the species, and thus the market value of the land is reduced, this reduction in value represents one measure of opportunity cost or change in economic efficiency. Similarly, the costs

[34] *Center for Biological Diversity et al, Plaintiffs, v. United States Bureau of Land Management et. al, Defendants and American Sand Association, et al, Defendant Intervenors*. Order re: Cross Motions for Summary Judgment, Case 3:03-cv-02509 Document 174 Filed 03/14/2006, pages 44-45.

[35] Director, U.S. Fish and Wildlife Service, Memorandum to Regional Directors and Manager of the California-Nevada Operations Office, Subject: Application of the "Destruction or Adverse Modification" Standard under Section 7(a)(2) of the Endangered Species Act, dated December 9, 2004.

[36] *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, No. 03-35279 (9th Circuit 2004).

incurred by a Federal action agency to consult with the Service under section 7 represent opportunity costs of CTS conservation efforts.

18. This analysis also addresses the distribution of impacts associated with the designation, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation efforts on small entities and the energy industry. This information may be used by decision-makers to assess whether the effects of species conservation efforts unduly burden a particular group or economic sector. For example, while conservation efforts may have a small impact relative to the national economy, individuals employed in a particular sector of the regional economy may experience relatively greater impacts. The differences between economic efficiency effects and distributional effects, as well as their application in this analysis, are discussed in greater detail below.

2.2.1 EFFICIENCY EFFECTS

19. At the guidance of OMB and in compliance with Executive Order 12866 "Regulatory Planning and Review," Federal agencies measure changes in economic efficiency in order to understand how society, as a whole, will be affected by a regulatory action. In the context of regulations that protect CTS habitat, these efficiency effects represent the opportunity cost of resources used or benefits foregone by society as a result of the regulations. Economists generally characterize opportunity costs in terms of changes in producer and consumer surpluses in affected markets.[37]

20. In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a Federal land manager may enter into a consultation with the Service to ensure that a particular activity will not adversely modify critical habitat. The effort required for the consultation is an economic opportunity cost because the landowner or manager's time and effort would have been spent in an alternative activity had the parcel not been included in the designation. When compliance activity is not expected to significantly affect markets -- that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price -- the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.

21. Where habitat protection measures are expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surpluses. For example, protection measures that reduce or preclude the development of large areas of land may shift the price and quantity of housing supplied in a region. In this case, changes in economic efficiency (i.e., social welfare) can be measured by considering changes in producer and consumer surplus in the market.

[37] For additional information on the definition of "surplus" and an explanation of consumer and producer surplus in the context of regulatory analysis, see: Gramlich, Edward M., A Guide to Benefit-Cost Analysis (2nd Ed.), Prospect Heights, Illinois: Waveland Press, Inc., 1990; and U.S. Environmental Protection Agency, Guidelines for Preparing Economic Analyses, EPA 240-R-00-003, September 2000, available at http://yosemite.epa.gov/ee/epa/eed.nsf/ webpages/Guidelines.html.

22. This analysis begins by measuring impacts associated with efforts undertaken to protect the CTS and its habitat. As noted above, in some cases, compliance costs can provide a reasonable estimate of changes in economic efficiency. However, if the cost of conservation efforts is expected to significantly impact markets, the analysis will consider potential changes in consumer and/or producer surplus in affected markets. In the case of the CTS, conservation efforts are not anticipated to significantly affect markets; therefore, this report focuses solely on compliance costs.

2.2.2 DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

23. Measurements of changes in economic efficiency focus on the net impact of conservation efforts, without consideration of how certain economic sectors or groups of people are affected. Thus, a discussion of efficiency effects alone may miss important distributional considerations. OMB encourages Federal agencies to consider distributional effects separately from efficiency effects.[38] This analysis considers several types of distributional effects, including impacts on small entities; impacts on energy supply, distribution, and use; and regional economic impacts. It is important to note that these are fundamentally different measures of economic impact than efficiency effects, and thus cannot be added to or compared with estimates of changes in economic efficiency.

Impacts on Small Entities and Energy Supply, Distribution, and Use

24. This analysis considers how small entities, including small businesses, organizations, and governments, as defined by the RFA, might be affected by future species conservation efforts.[39] In addition, in response to Executive Order 13211 "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," this analysis considers the future impacts of conservation efforts on the energy industry and its customers.[40]

Regional Economic Effects

25. Regional economic impact analysis can provide an assessment of the potential localized effects of conservation efforts. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models. These models rely on multipliers that represent the relationship between a change in one sector of the economy (e.g., expenditures by recreators) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to recreators). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.

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[38] U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf.

[39] 5 U.S.C. §§601 *et seq*.

[40] Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001.

26. The use of regional input/output models in an analysis of the impacts of species and habitat conservation efforts can overstate the long-term impacts of a regulatory change. Most importantly, these models provide a static view of the economy of a region. That is, they measure the initial impact of a regulatory change on an economy but do not consider long-term adjustments that the economy will make in response to this change. For example, these models provide estimates of the number of jobs lost as a result of a regulatory change, but do not consider re-employment of these individuals over time or other adaptive responses by impacted businesses. In addition, the flow of goods and services across the regional boundaries defined in the model may change as a result of the regulation, compensating for a potential decrease in economic activity within the region.

27. Despite these and other limitations, in certain circumstances regional economic impact analysis may provide useful information about the scale and scope of localized impacts. It is important to remember that measures of regional economic effects generally reflect shifts in resource use rather than efficiency losses. Thus, these types of distributional effects are reported separately from efficiency effects (i.e., not summed). In addition, measures of regional economic impact cannot be compared with estimates of efficiency effects, but should be considered as distinct measures of impact.

28. Impacts associated with CTS conservation activities largely include administrative costs; the quantity of housing supplied in the broader region is not anticipated to be affected. Therefore, measurable impacts of the type typically assessed with input-output models are not anticipated.

2.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS

29. This analysis identifies those economic activities most likely to threaten the listed species and its habitat and, where possible, quantifies the economic impact to avoid or minimize such threats within the boundaries of the proposed critical habitat area, as described in Chapter 1. This section provides a description of the methodology used to separately identify baseline impacts and incremental impacts stemming from the proposed designation of critical habitat for the CTS. This evaluation of impacts in a "with critical habitat designation" versus a "without critical habitat designation" framework effectively measures the net change in economic activity associated with the revised proposed rulemaking.

2.3.1 IDENTIFYING BASELINE IMPACTS

30. The baseline for this analysis is the existing state of regulation, prior to the designation of critical habitat, which provides protection to the species under the Act, as well as under other Federal, State and local laws and guidelines. This "without critical habitat designation" scenario also considers a wide range of additional factors beyond the compliance costs of regulations that provide protection to the listed species. As recommended by OMB, the baseline incorporates, as appropriate, trends in market conditions, implementation of other regulations and policies by the Service and other government entities, and trends in other factors that have the potential to affect economic

costs and benefits, such as the rate of regional economic growth in potentially affected industries.

31. Baseline impacts include sections 7, 9, and 10 of the Act, and economic impacts resulting from these protections to the extent that they are expected to occur absent the designation of critical habitat for the species.

- Section 7 of the Act, absent critical habitat designation, requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species. The portion of the administrative costs of consultations under the jeopardy standard, along with the impacts of project modifications resulting from consideration of this standard, are considered baseline impacts. Baseline administrative costs of section 7 consultation are summarized later in Exhibit 2-3.
- Section 9 defines the actions that are prohibited by the Act. In particular, it prohibits the "take" of endangered wildlife, where "take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."[41] The economic impacts associated with this section manifest themselves in sections 7 and 10.
- Under section 10(a)(1)(B) of the Act, an entity (e.g., a landowner or local government) may develop an HCP for a listed animal species in order to meet the conditions for issuance of an incidental take permit in connection with the development and management of a property.[42] The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are adequately avoided or minimized. The development and implementation of HCPs is considered a baseline protection for the species and habitat unless the HCP is determined to be precipitated by the designation of critical habitat, or the designation influences stipulated conservation efforts under HCPs.

Enforcement actions taken in response to violations of the Act are not included in this analysis.

32. The protection of listed species and habitat is not limited to the Act. Other Federal agencies, as well as State and local governments, may also seek to protect the natural resources under their jurisdiction. If compliance with the CWA or State environmental quality laws, for example, protects habitat for the species, such protective efforts are considered to be baseline protections and costs associated with these efforts are categorized accordingly. Of note, however, is that such efforts may not be considered baseline in the case that they would not have been triggered absent the designation of critical habitat. In these cases, they are considered incremental impacts and are discussed below.

[41] 16 U.S.C. 1532.

[42] U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at http://endangered.fws.gov/hcp/.

2.3.2 IDENTIFYING INCREMENTAL IMPACTS

33. This analysis separately quantifies the incremental impacts of this rulemaking. The focus of the incremental analysis is to determine the impacts on land uses and activities from the designation of critical habitat that are above and beyond those impacts due to required or voluntary conservation efforts undertaken due to other Federal, State, and local regulations or guidelines.

34. When critical habitat is designated, section 7 requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat (in addition to considering whether the actions are likely to jeopardize the continued existence of the species). The added administrative costs of including consideration of critical habitat in section 7 consultations, and the additional impacts of implementing project modifications resulting from the protection of critical habitat are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental impacts of the rulemaking.

35. Incremental impacts may be the direct compliance costs associated with additional effort for consultations, reinitiated consultation, new consultations occurring specifically because of the designation, and additional project modifications that would not have been required under the jeopardy standard. Additionally, incremental impacts may include indirect impacts resulting from reaction to the potential designation of critical habitat (e.g., implementing CTS management direction in an effort to avoid designation of critical habitat), triggering of additional requirements under State or local laws intended to protect sensitive habitat, and uncertainty and perceptional effects on markets.

Direct Impacts

36. The direct, incremental impacts of critical habitat designation stem from the consideration of the potential for destruction or adverse modification of critical habitat during section 7 consultations. The two categories of direct, incremental impacts of critical habitat designation are: 1) the administrative costs of conducting section 7 consultation; and 2) implementation of any project modifications requested by the Service through section 7 consultation solely to avoid potential destruction or adverse modification of critical habitat or to minimize impacts to critical habitat.

37. Section 7(a)(2) of the Act requires Federal agencies (Action agencies) to consult with the Service whenever activities that they undertake, authorize, permit, or fund may affect a listed species or designated critical habitat. In some cases, consultations will involve the Service and another Federal agency only, such as the Corps. Often, they will also include a third party involved in projects that involve a permitted entity, such as the recipient of a CWA section 404 permit.

38. During a consultation, the Service, the Action agency, and the entity applying for Federal funding or permitting (if applicable) communicate in an effort to minimize potential adverse effects to the species and/or to the proposed critical habitat. Communication between these parties may occur via written letters, phone calls, in-person meetings, or any combination of these. The duration and complexity of these interactions depends on a number of variables, including the type of consultation, the species, the activity of

concern, and the potential effects to the species and designated critical habitat associated with the proposed activity, the Federal agency, and whether there is a private applicant involved.

39. Section 7 consultations with the Service may be either informal or formal. *Informal consultation*s consist of discussions between the Service, the Action agency, and the applicant concerning an action that may affect a listed species or its designated critical habitat, and are designed to identify and resolve potential concerns at an early stage in the planning process. By contrast, a *formal consultation* is required if the Action agency determines that its proposed action may or will adversely affect the listed species or designated critical habitat in ways that cannot be resolved through informal consultation. The formal consultation process results in the Service's determination in its Biological Opinion of whether the action is likely to jeopardize a species or adversely modify critical habitat, and recommendations to minimize those impacts. Regardless of the type of consultation or proposed project, section 7 consultations can require substantial administrative effort on the part of all participants.

Administrative Section 7 Consultation Costs

40. Parties involved in section 7 consultations include the Service, a Federal "action agency," and in some cases, a private entity involved in the project or land use activity. The action agency (i.e., the Federal nexus necessitating the consultation) serves as the liaison with the Service. While consultations are required for activities that involve a Federal nexus and may affect a species regardless of whether critical habitat is designated, the designation may increase the effort for consultations in the case that the project or activity in question may adversely modify critical habitat. Administrative efforts for consultation may therefore result in both baseline and incremental impacts.

41. In general, three different scenarios associated with the designation of critical habitat may trigger incremental administrative consultation costs:

    1. **Additional effort to address adverse modification in a new consultation -** New consultations taking place after critical habitat designation may require additional effort to address critical habitat issues above and beyond the listing issues. In this case, only the additional administrative effort required to consider critical habitat is considered an incremental impact of the designation.
    2. **Re-initiation of consultation to address adverse modification -** Consultations that have already been completed on a project or activity may require re-initiation to address critical habitat. In this case, the costs of re-initiating the consultation, including all associated administrative and project modification costs are considered incremental impacts of the designation.
    3. **Incremental consultation resulting entirely from critical habitat designation -** Critical habitat designation may trigger additional consultations that may not occur absent the designation (e.g., for an activity for which adverse modification may be an issue, while jeopardy is not, or consultations resulting from the new information about the potential presence of the species provided by the

designation). Such consultations may, for example, be triggered in critical habitat areas that are not occupied by the species. All associated administrative and project modification costs of incremental consultations are considered incremental impacts of the designation.

42. The administrative costs of these consultations vary depending on the specifics of the project. One way to address this variability is to show a range of possible costs of consultation, as it may not be possible to predict the precise outcome of each future consultation in terms of level of effort. Review of consultation records and discussions with Service field offices resulted in a range of estimated administrative costs of consultation. For simplicity, the average of the range of costs in each category is applied in this analysis.

43. Exhibit 2-2 provides estimated administrative consultation costs representing effort required for all types of consultation, including those that considered both adverse modification and jeopardy. To estimate the fractions of the total administrative consultation costs that are baseline and incremental, the following assumptions are applied.

- The greatest effort will be associated with consultations that consider both jeopardy and adverse modification. Depending on whether the consultation is precipitated by the listing or the critical habitat designation, part or all of the costs, respectively, will be attributed to the proposed rule.
- Efficiencies exist when considering both jeopardy and adverse modification at the same time (e.g., in staff time saved for project review and report writing), and therefore incremental administrative costs of considering adverse modification in consultations precipitated by the listing result in the least incremental effort, roughly one-quarter of the cost of the entire consultation. The remaining three-quarters of the costs are attributed to consideration of the jeopardy standard in the baseline scenario. This latter amount also represents the cost of a consultation that only considers adverse modification (e.g., an incremental consultation for activities in unoccupied critical habitat) and is attributed wholly to critical habitat.
- Incremental costs of the re-initiation of a previously completed consultation because of the critical habitat designation are assumed to be approximately half the cost of a consultation considering both jeopardy and adverse modification. This assumes that re-initiations are less time-consuming as the groundwork for the project has already been considered in terms of its effect on the species. However, because the previously completed effort must be re-opened, they are more costly than simply adding consideration of critical habitat to a consultation already underway.

EXHIBIT 2-2 RANGE OF ADMINISTRATIVE CONSULTATIONS COSTS (2010 DOLLARS)

BASELINE ADMINISTRATIVE COSTS OF CONSULTATION					
CONSULTATION TYPE	**SERVICE**	**FEDERAL AGENCY**	**THIRD PARTY**	**BIOLOGICAL ASSESSMENT**	**TOTAL COSTS**
CONSULTATION CONSIDERING JEOPARDY (DOES NOT INCLUDE CONSIDERATION OF ADVERSE MODIFICATION)					
Technical Assistance	$428	n/a	$788	n/a	$1,215
Informal	$1,838	$2,325	$1,538	$1,500	$7,125
Formal	$4,125	$4,650	$2,625	$3,600	$15,000
Programmatic	$12,488	$10,388	n/a	$4,200	$27,075
INCREMENTAL ADMINISTRATIVE COSTS OF CONSULTATION					
CONSULTATION TYPE	**SERVICE**	**FEDERAL AGENCY**	**THIRD PARTY**	**BIOLOGICAL ASSESSMENT**	**TOTAL COSTS**
NEW CONSULTATION RESULTING ENTIRELY FROM CRITICAL HABITAT DESIGNATION (TOTAL COST OF A CONSULTATION CONSIDERING BOTH JEOPARDY AND ADVERSE MODIFICATION)					
Technical Assistance	$570	n/a	$1,050	n/a	$1,620
Informal	$2,450	$3,100	$2,050	$2,000	$9,500
Formal	$5,500	$6,200	$3,500	$4,800	$20,000
Programmatic	$16,650	$13,850	n/a	$5,600	$36,100
NEW CONSULTATION CONSIDERING ONLY ADVERSE MODIFICATION (UNOCCUPIED HABITAT)					
Technical Assistance	$428	n/a	$788	n/a	$1,215
Informal	$1,838	$2,325	$1,538	$1,500	$7,125
Formal	$4,125	$4,650	$2,625	$3,600	$15,000
Programmatic	$12,488	$10,388	n/a	$4,200	$27,075
RE-INITIATION OF CONSULTATION TO ADDRESS ADVERSE MODIFICATION					
Technical Assistance	$285	n/a	$525	n/a	$810
Informal	$1,225	$1,550	$1,025	$1,000	$4,750
Formal	$2,750	$3,100	$1,750	$2,400	$10,000
Programmatic	$8,325	$6,925	n/a	$2,800	$18,050
ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION (ADDITIVE WITH BASELINE COSTS ABOVE OF CONSIDERING JEOPARDY)					
Technical Assistance	$143	n/a	$263	n/a	$405
Informal	$613	$775	$513	$500	$2,375
Formal	$1,375	$1,550	$875	$1,200	$5,000
Programmatic	$4,163	$3,463	n/a	$1,400	$9,025

Source: IEc analysis of full administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2009, and a review of consultation records from several Service field offices across the country conducted in 2002.
Notes:
1. Estimates are rounded to three significant digits and may not sum due to rounding.
2. Estimates reflect average hourly time required by staff.

Section 7 Project Modification Impacts

44. Section 7 consultation considering critical habitat may also result in additional project modification recommendations specifically addressing potential destruction or adverse modification of critical habitat. For forecast consultations considering jeopardy and adverse modification, and for re-initiations of past consultations to consider critical habitat, the economic impacts of project modifications undertaken solely to avoid adverse modification or to minimize impacts to critical habitat are considered incremental impacts of critical habitat designation. For consultations that are forecast to occur specifically because of the designation (incremental consultations), impacts of all associated project modifications are assumed to be incremental impacts of the designation. This is summarized below.

1. **Additional effort to address adverse modification in a new consultation -** Only project modifications above and beyond what would be requested to avoid or minimize jeopardy are considered incremental.
2. **Re-initiation of consultation to address adverse modification -** Only project modifications above and beyond what was requested to avoid or minimize jeopardy are considered incremental.
3. **Incremental consultation resulting entirely from critical habitat designation -** Impacts of all project modifications are considered incremental.

Specific Steps Applied to Identify and Quantify Incremental Impacts

45. The next section describes a sample methodology to identify and separate baseline and incremental impacts. A flowchart depicting the sample methodology is presented in Exhibit 2-3. Ultimately, this analysis applies a simplified version of the sample methodology described in the next section and Exhibit 2-3 because incremental impacts are limited to the administrative costs of section 7 consultation (see Chapters 3 and 4 for additional detail). The next section is included to demonstrate the methodology that would be applied to estimate incremental impacts, if impacts beyond the administrative cost of consultation were expected to occur.

46. In practice, incremental impacts depend solely on a project's location within "may/likely to affect" areas or "unlikely to affect" areas (described in greater detail in the next section). As described by the Service in their incremental memo to IEc, section 7 consultation would be required within may/likely to affect areas absent critical habitat. Incremental impacts to projects located within may/likely to affect areas are limited to the additional administrative cost of addressing adverse modification in a new consultation considering both jeopardy and adverse modification (see Exhibit 2-2 for costs). Projects within unlikely to affect areas would not require section 7 consultation absent critical habitat because CTS is not expected to occur in these areas. Thus, incremental impacts to

projects located within unlikely to affect areas are equal to the cost of a new consultation considering only adverse modification (see Exhibit 2-2 for costs).[43]

Methodology to Estimate Incremental Impacts Beyond Administrative Costs

47. Based on the Programmatic and Table 1 in the incremental memorandum provided by the Service (see Appendix D), proposed critical habitat can be broken into three potential effect categories with regards to the CTS and its habitat: no effect; unlikely to affect; and, may/likely to affect.[44,45] Within the may/likely to affect category there are areas of high CTS occurrence and areas of unknown occurrence levels. The distribution of the effect categories and CTS occurrence is presented in Exhibit 2-4. Potential baseline and incremental impacts to projects occurring within the study area depend on the location of the project relative to the three potential effect categories. The methodology to separate incremental impacts from baseline impacts is described in greater detail for each effect category below.

- **No Effect:** no effect areas include developed lands and hardscape within the study area. The Proposed Rule states that the Service made "every effort to avoid including developed areas such as lands covered by buildings, pavement, and other structures" within the study area. These areas are not proposed as critical habitat and, as such, are not considered in the economic analysis. There are no baseline or incremental impacts in these areas as the Service will not require section 7 consultation for CTS for projects in no effect areas.[46]
- **Unlikely to Affect:** unlikely to affect areas are located within the 100-year floodplain for the Laguna de Santa Rosa River or other low-lying areas subject to periodic flooding where the CTS is not known to exist. The Service's incremental memo to IEc identifies an additional unlikely to affect area of undeveloped agricultural and general range lands located in the southeastern portion of the study area.[47] Given that the CTS is not known to exist in these areas, any administrative costs of section 7 consultation or project modification costs are attributable entirely to the designation of critical habitat (i.e., incremental impacts)

[43] U.S. Fish and Wildlife Service to Industrial Economics, Incorporated. August 4, 2010. "Comments on how the Draft Economic Analysis Should Estimate Incremental Costs for the California Tiger Salamander (*Ambystoma californiense*), Sonoma Distinct Population Segment, Re-proposed Critical Habitat Designation."

[44] U.S. Fish and Wildlife Service to U.S. Army Corps of Engineers. Programmatic Biological Opinion (Programmatic) for U.S. Army Corps of Engineers (Corps) Permitted Projects that May Affect California Tiger Salamander and Three Endangered Plant Species on the Santa Rosa Plain, California (Corps File Number 223420N). 81420-2008-F-0261. November 9, 2007.

[45] U.S. Fish and Wildlife Service to Industrial Economics, Incorporated. August 4, 2010. "Comments on how the Draft Economic Analysis Should Estimate Incremental Costs for the California Tiger Salamander (*Ambystoma californiense*), Sonoma Distinct Population Segment, Re-proposed Critical Habitat Designation."

[46] U.S. Fish and Wildlife Service to Industrial Economics, Incorporated. August 4, 2010. "Comments on how the Draft Economic Analysis Should Estimate Incremental Costs for the California Tiger Salamander (*Ambystoma californiense*), Sonoma Distinct Population Segment, Re-proposed Critical Habitat Designation."

[47] No spatial data are available for this additional unlikely to affect area. Therefore, Exhibit 2-4, which is based on spatial data developed for the Programmatic includes this area within the no effect category. For the purposes of the economic analysis, however, this area is correctly classified as unlikely to affect.

because no consultation would be required in these areas absent critical habitat. Project modifications may be requested in these areas as part of the section 7 consultation process if a project is likely to result in adverse modification of critical habitat.[48]

- **May/Likely to Affect:** The CTS may or may not be present within may/likely to affect areas. The potential baseline and incremental impacts to projects within these areas depend on the presence (or assumed presence) of the CTS within the project area. If the CTS is present or assumed to be present within a project area, the Service may request conservation measures if the project is likely to adversely affect or result in take of the species. In such cases, the Service expects that conservation measures implemented to avoid jeopardy will be sufficient to avoid adverse modification of critical habitat; as such, the Service does not expect to request additional conservation measures to avoid adverse modification of critical habitat beyond the conservation measures requested to avoid jeopardy. The cost of all conservation measures, therefore, are considered baseline when the CTS is present or assumed to be present in a project area.

  If the CTS is absent from a project area within proposed critical habitat, the Service may request conservation measures to avoid adverse modification of critical habitat. These measures may be similar to measures requested to avoid jeopardy (in areas where the CTS is present). In the absence of critical habitat, the Service would not request conservation measures in areas where the CTS is absent. The costs of conservation measures implemented to avoid adverse modification of critical habitat in areas where the CTS is absent are, therefore, considered incremental impacts of critical habitat designation.

  Given the potential presence of the CTS in may/likely to affect areas, the Service requires section 7 consultation in these areas regardless of whether or not the species is present. Such consultations would occur absent critical habitat. As such, only the additional administrative costs of addressing adverse modification in section 7 consultations for CTS within may/likely to affect areas are considered incremental.

  As described in the Programmatic and the Conservation Strategy, project proponents may assume that the CTS is present and apply the necessary conservation measures; or, project proponents may conduct protocol surveys to determine the presence/absence of the species within a project area. The likelihood of a project proponent surveying, rather than assuming its presence, depends on the proximity of the project to known CTS occurrences.

  In areas with a high CTS occurrence rate, project areas are expected to be occupied. The Service estimates that 15 percent of project proponents will conduct surveys in areas expected to be occupied; while 85 percent of project

[48] U.S. Fish and Wildlife Service to Industrial Economics, Incorporated. August 4, 2010. "Comments on how the Draft Economic Analysis Should Estimate Incremental Costs for the California Tiger Salamander (*Ambystoma californiense*), Sonoma Distinct Population Segment, Re-proposed Critical Habitat Designation."

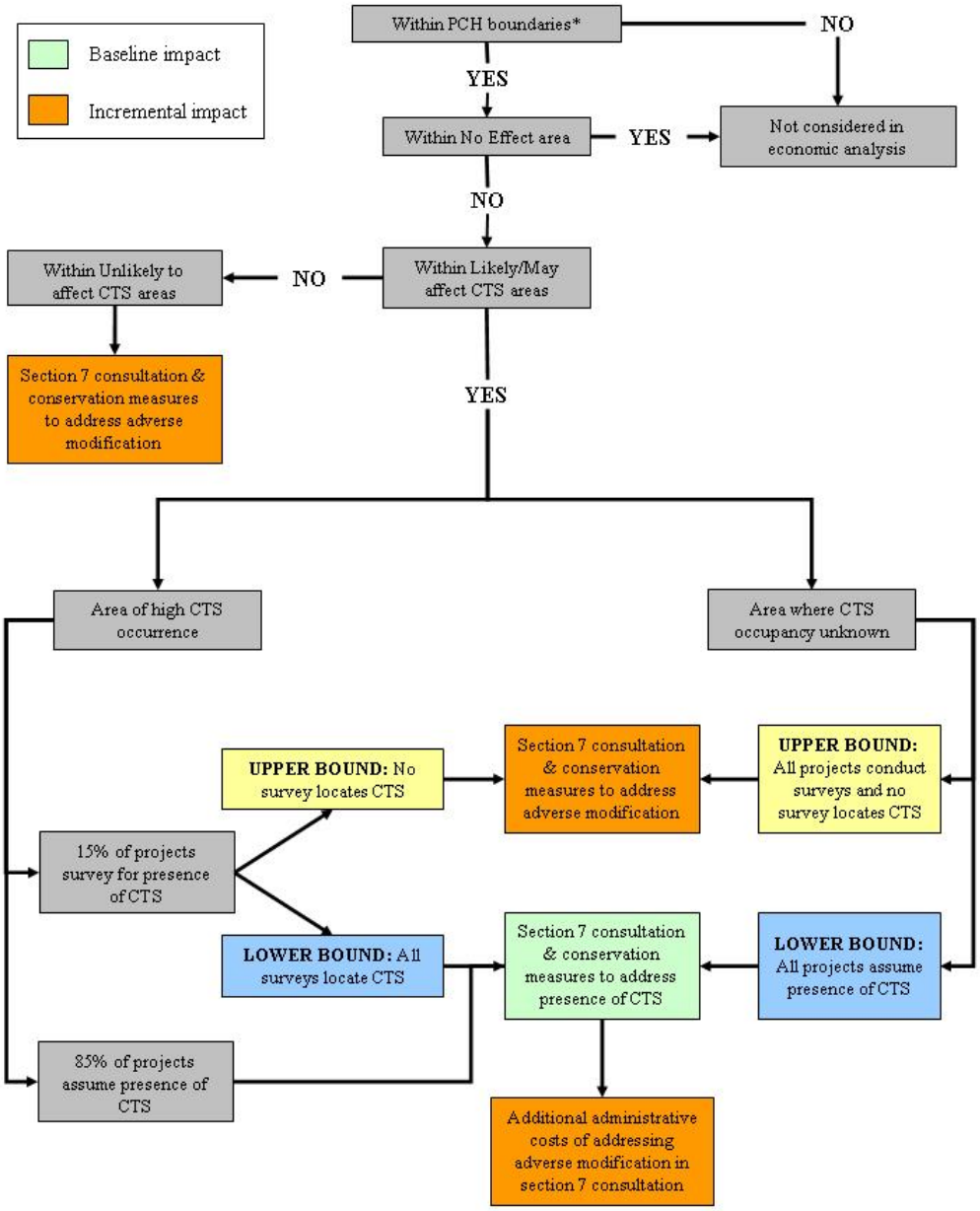
proponents will assume that the CTS is present. If the CTS is assumed to be present, then any conservation measures requested by the Service would be requested absent critical habitat. As such, the costs of any conservation measures implemented in areas where the CTS is assumed to be present are considered baseline. If a project proponent conducts protocol surveys and locates the CTS within the project area, then the same conditions apply as if CTS presence is assumed: costs of conservation measures are considered baseline. If protocol surveys fail to locate the CTS, any conservation measures requested by the Service would solely address adverse modification (because the CTS is absent). In this case, costs of conservation measures are considered incremental.

Current CTS occurrence data are insufficient to estimate the probability that protocol surveys will locate the species. This report, therefore, considers a bounding analysis to estimate impacts in area of high CTS occurrence (see left-hand branch in Exhibit 2-3). Under the lower bound, all protocol surveys locate the species. In this case, the costs of all conservation measures implemented within areas of high occurrence are considered baseline as there are no areas where the CTS is absent. Under the upper bound scenario, all protocol surveys fail to locate the CTS. Given that 15 percent of project proponents are expected to conduct surveys in areas of high occurrence, 15 percent of conservation measure costs are considered incremental; the remaining 85 percent of conservation measure costs are considered baseline as they are associated with projects where CTS presence is assumed.

In areas with few known occurrences of CTS, the potential for the project area to be occupied is reduced. The likelihood that project proponents will conduct surveys in areas where presence is unknown depends on the proximity of the project area to known CTS occurrences, connectivity with breeding habitat, and on the history of the CTS in the project area. Given the uncertainty regarding: a) the proportion of project proponents that conduct surveys versus assume presence, and, b) the probability that protocol surveys locate the species, this report considers a bounding analysis to estimate impacts in areas of unknown occurrence (see right-hand branch in Exhibit 2-3). Under the lower bound, all project proponents assume CTS is present. The costs of any conservation measures requested by the Service are considered baseline under the lower bound because such measures would be requested absent critical habitat. Under the upper bound, this report assumes that all project proponents conduct protocol surveys and all surveys locate the CTS within project areas. In this case, the costs of any conservation measures requested by the Service are considered incremental because such measures would not be requested absent critical habitat.[49]

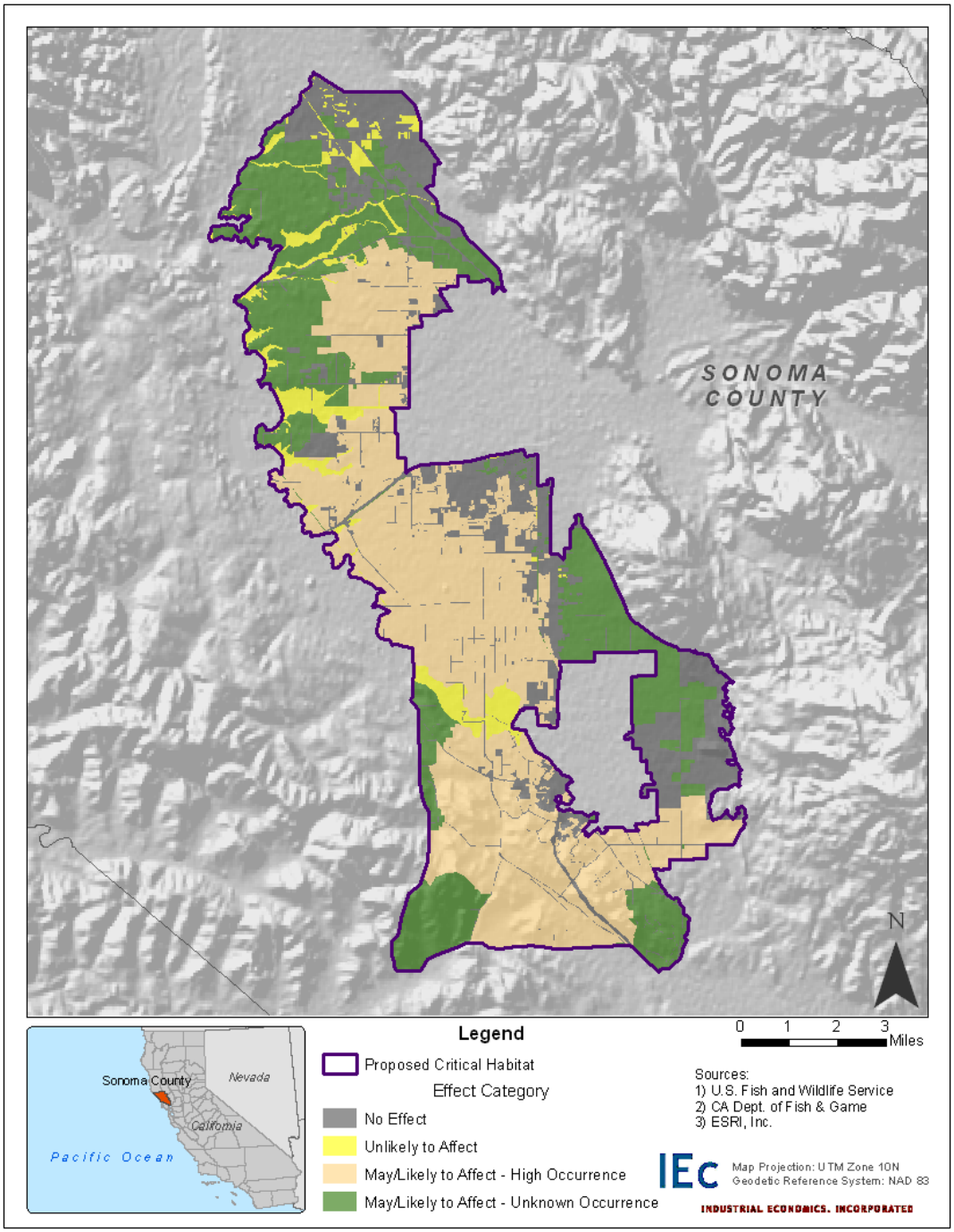
[49] U.S. Fish and Wildlife Service to Industrial Economics, Incorporated. August 4, 2010. "Comments on how the Draft Economic Analysis Should Estimate Incremental Costs for the California Tiger Salamander (*Ambystoma californiense*), Sonoma Distinct Population Segment, Re-proposed Critical Habitat Designation."

EXHIBIT 2-3 STEPS USED TO IDENTIFY AND SEPARATE BASELINE AND INCREMENTAL IMPACTS



*All projects within PCH boundaries will either have a Federal nexus or be subject to CEQA, with the potential exception of some agricultural projects.

EXHIBIT 2-4 DISTRIBUTION OF NO EFFECT, UNLIKELY TO AFFECT, AND MAY/LIKELY TO AFFECT CATEGORIES WITHIN PROPOSED CRITICAL HABITAT[50]



[50] A portion of the "No Effect" area along the southeastern boundary of the proposed critical habitat has been identified by the Service as an "Unlikely to Affect" area. Exhibit 2-4 is based on spatial data developed by the California Department of Fish and Game for the Programmatic, which classifies this area as "no effect/hardscape." Given the lack of spatial data for the additional unlikely to affect area, it is displayed within the no effect category in Exhibit 2-4. For the purposes of the economic analysis, however, this area is correctly classified as unlikely to affect.

Indirect Impacts

48. The designation of critical habitat may, under certain circumstances, affect actions that do not have a Federal nexus and thus are not subject to the provisions of section 7 under the Act. Indirect impacts are those unintended changes in economic behavior that may occur outside of the Act, through other Federal, State, or local actions, and that are caused by the designation of critical habitat. This section identifies common types of indirect impacts that may be associated with the designation of critical habitat. Importantly, these types of impacts are not always considered incremental. In the case that these types of conservation efforts and economic effects are expected to occur regardless of critical habitat designation, they are appropriately considered baseline impacts in this analysis.

Habitat Conservation Plans

49. Under section 10 of the Act, landowners seeking an incidental take permit must develop an HCP to counterbalance the potential harmful effects that an otherwise lawful activity may have on a species. As such, the purpose of the habitat conservation planning process is to ensure that the effects of incidental take are adequately avoided or minimized. Thus, HCPs are developed to ensure compliance with section 9 of the Act and to meet the requirements of section 10 of the Act.

50. One existing HCP include the CTS as a covered species. The Sonoma County Office of Education's Low-Effect HCP covers approximately 4.42 acres in Santa Rosa, California. At this time, the Service is not proposing the exclusion of this, or any areas under section 4(b)(2) of the Act.[51]

51. Application for an incidental take permit and completion of an HCP are not required or necessarily recommended by a critical habitat designation. However, in certain situations the new information provided by the proposed critical habitat rule may prompt a landowner to apply for an incidental take permit. For example, a landowner may have been previously unaware of the potential presence of the species on his or her property, and expeditious completion of an HCP may offer the landowner regulatory relief in the form of exclusion from the final critical habitat designation. In this case, the effort involved in creating the HCP and undertaking associated conservation efforts are considered an incremental effect of designation. No specific plans to prepare new HCPs in response to this proposed designation were identified.

Other State and Local Laws

52. Under certain circumstances, critical habitat designation may provide new information to a community about the sensitive ecological nature of a geographic region, potentially triggering additional economic impacts under other State or local laws. In cases where these impacts would not have been triggered absent critical habitat designation, they are considered indirect, incremental impacts of the designation.

53. The California Environmental Quality Act (CEQA), for example, requires that lead agencies, public agencies responsible for project approval, consider the environmental

[51] 74 FR 41669.

effects of proposed projects that are considered discretionary in nature and not categorically or statutorily exempt. In some instances, critical habitat designation may trigger CEQA-related requirements. This is most likely to occur in areas where the critical habitat designation provides clearer information on the importance of particular areas as habitat for a listed species. In addition, applicants who were "categorically exempt" from preparing an Environmental Impact Report (EIR) under CEQA may no longer be exempt once critical habitat is designated. In cases where the designation triggers the CEQA significance test or results in a reduction of categorically exempt activities, associated impacts are considered to be an indirect, incremental effect of the designation.

Additional Indirect Impacts

54. In addition to the indirect effects of compliance with other laws or triggered by the designation, project proponents, land managers and landowners may face additional indirect impacts, including the following:

- **Time Delays -** Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the need to reinitiate the section 7 consultation process and/or compliance with other laws triggered by the designation. To the extent that delays result from the designation, they are considered indirect, incremental impacts of the designation.
- **Regulatory Uncertainty -** The Service conducts each section 7 consultation on a case-by-case basis and issues a biological opinion on formal consultations based on species-specific and site-specific information. As a result, government agencies and affiliated private parties who consult with the Service under section 7 may face uncertainty concerning whether project modifications will be recommended by the Service and what the nature of these modifications will be. This uncertainty may diminish as consultations are completed and additional information becomes available on the effects of critical habitat on specific activities. Where information suggests that this type of regulatory uncertainty stemming from the designation may affect a project or economic behavior, associated impacts are considered indirect, incremental impacts of the designation. For the CTS, such uncertainty is less likely given the number of public plans outlining Service-approved conservation measures for the species. Thus, impacts of regulatory uncertainty are not quantified.
- **Stigma -** In some cases, the public may perceive that critical habitat designation may result in limitations on private property uses above and beyond those associated with anticipated project modifications and regulatory uncertainty described above. Public attitudes about the limits or restrictions that critical habitat may impose can cause real economic effects to property owners, regardless of whether such limits are actually imposed. All else equal, a property that is designated as critical habitat may have a lower market value than an identical property that is not within the boundaries of critical habitat due to perceived limitations or restrictions. As the public becomes aware of the true regulatory

burden imposed by critical habitat, the impact of the designation on property markets may decrease. To the extent that potential stigma effects on markets are probable and identifiable, these impacts are considered indirect, incremental impacts of the designation.

2.3.3 BENEFITS

55. Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.[52] OMB's Circular A-4 distinguishes two types of economic benefits: *direct benefits and ancillary benefits*. Ancillary benefits are defined as favorable impacts of a rulemaking that are typically unrelated, or secondary, to the statutory purpose of the rulemaking.[53]

56. In the context of critical habitat, the primary purpose of the rulemaking (i.e., the direct benefit) is the potential to enhance conservation of the species. The published economics literature has documented that social welfare benefits can result from the conservation and recovery of endangered and threatened species. In its guidance for implementing Executive Order 12866, OMB acknowledges that it may not be feasible to monetize, or even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of resources on the implementing agency's part to conduct new research.[54] *Rather than rely on economic measures, the Service believes that the direct benefits of the proposed rule are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.*

57. Critical habitat designation may also generate ancillary benefits. Critical habitat aids in the conservation of species specifically by protecting the PCEs on which the species depends. To this end, critical habitat designation can result in maintenance of particular environmental conditions that may generate other social benefits aside from the preservation of the species. That is, management actions undertaken to conserve a species or habitat may have coincident, positive social welfare implications, such as increased recreational opportunities in a region. While they are not the primary purpose of critical habitat, these ancillary benefits may result in gains in employment, output, or income that may offset the direct, negative impacts to a region's economy resulting from actions to conserve a species or its habitat. The potential ancillary benefits of critical habitat designation are described qualitatively in a separate chapter at the end of this report.

2.3.4 GEOGRAPHIC SCOPE OF THE ANALYSIS

58. Economic impacts of CTS conservation are considered across the entire area proposed for revised critical habitat designation, as defined in Chapter 1. Results will be presented at

[52] Executive Order 12866, Regulatory Planning and Review, September 30, 1993.

[53] U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf.

[54] *Ibid*.

the unit level. Costs will be further disaggregated to distinguish between costs associated with activities in the five urban growth boundaries (Santa Rosa, Rohnert Park, Cotati, Windsor, and Petaluma) intersecting proposed critical habitat and activities outside of urban growth boundaries (six regions in total).

2.3.5 ANALYTIC TIME FRAME

59. The analysis estimates impacts based on activities that are "reasonably foreseeable," including, but not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available. The analysis estimates economic impacts to activities from 2011 (expected year of final revised critical habitat designation) to 2035. This time frame is selected based on the availability of development projection data obtained from ABAG.[55]

2.4 INFORMATION SOURCES

60. The primary sources of information for this report are communications with, and data provided by, personnel from the Service, local governments and other stakeholders. Some of this information and data is provided in public comment letters submitted in response to the Proposed Rule.[56] In addition, the analysis draws on the Programmatic for Corps activities, the Conservation Strategy, the section 7 consultation history, historical conservation efforts for the species, published information, and GIS data. A complete list of references is provided at the end of this document.

[55] Association of Bay Area Governments. Projections 2009 by Census Tract. Accessed online at: http://www.abag.ca.gov/planning/currentfcst/ on June 22, 2010.

[56] 74 FR 41662.

CHAPTER 3 | RESIDENTIAL & COMMERCIAL DEVELOPMENT

61. Development activities are considered a potential threat to the CTS and its habitat given that development can compromise the function of wetland habitats utilized by the CTS through the fill of wetlands and the creation of impassable barriers between wetlands and associated upland habitat.[57] Future development is expected to occur mainly within the five urban areas intersecting the study area: Windsor, Santa Rosa, Sebastopol, Rohnert Park, Cotati, and Petaluma. Each of the five urban areas is defined by urban growth boundaries (UGBs) designed to limit high density development to urban areas. The majority of the Sonoma County population (~70 percent) lives within urban areas.[58] Further, one of the goals of the Sonoma County General Plan is to: "Limit the amount of population growth and development in rural portions of the County outside of the cities and the unincorporated communities." This goal is reflected in the relatively low development densities allowed outside of urban areas and unincorporated communities. Given current zoning and landuse designations and review of past development projects, residential, commercial, and industrial development are all expected to occur within the study area in the future.

62. Baseline and incremental impacts to future development due to CTS conservation may include costs associated with minimizing the effect of development projects on the CTS and its habitat and completing section 7 consultation for the CTS. Baseline impacts are also expected to include costs associated with establishing CTS mitigation areas to offset unavoidable impacts to the CTS and its habitat (according to the mitigation ratios defined in the Conservation Strategy and Programmatic) pursuant to section 404 of the CWA.

63. This chapter forecasts future development within proposed revised critical habitat; describes potential baseline and incremental impacts associated with CTS conservation; and, finally, quantifies incremental impacts to future development. Exhibit 3-1 summarizes the incremental impacts to development quantified in this chapter. Exhibit 3-2 provides an overview of the analytic approach applied to estimate incremental impacts.

[57] 74 PR 41662.

[58] Sonoma County Permits and Resource Management Department. 2008. Sonoma County General Plan 2020. Adopted by Resolution No. 08-0808 of the Sonoma County Board of Supervisors September 23, 2008.

EXHIBIT 3-1 PRESENT VALUE INCREMENTAL IMPACTS TO FORECAST DEVELOPMENT WITHIN THE STUDY AREA (2011 – 2035, 2010 DOLLARS)

IMPACT TYPE	7 PERCENT DISCOUNT RATE	3 PERCENT DISCOUNT RATE
Present Value Impacts	$441,000	$659,000
Annualized Impacts	$37,900	$37,900

3.1 SCOPE OF FUTURE DEVELOPMENT

64. The majority of past development activity within the study area has been the construction of residential subdivisions. Commercial and industrial development projects, including the construction of office space, shopping complexes, and warehouses, have also occurred within the study area to a lesser extent. Recent development has been limited, most likely due to the current economic downturn. Several cities and towns, including Windsor and Cotati noted that few development projects are currently occurring due to the slow economy.[59] Despite the limited development activity currently occurring within the study area, this analysis forecasts future development based on county-level projections for 2011 through 2035 assuming that future development in the study area will increase to meet current projections. The following section describes the methods used to forecast development within the study area based on county-wide projections and presents development forecasts for each urban area (defined by UBGs) intersecting the study area as well as non-urban areas (i.e., areas outside UBGs).

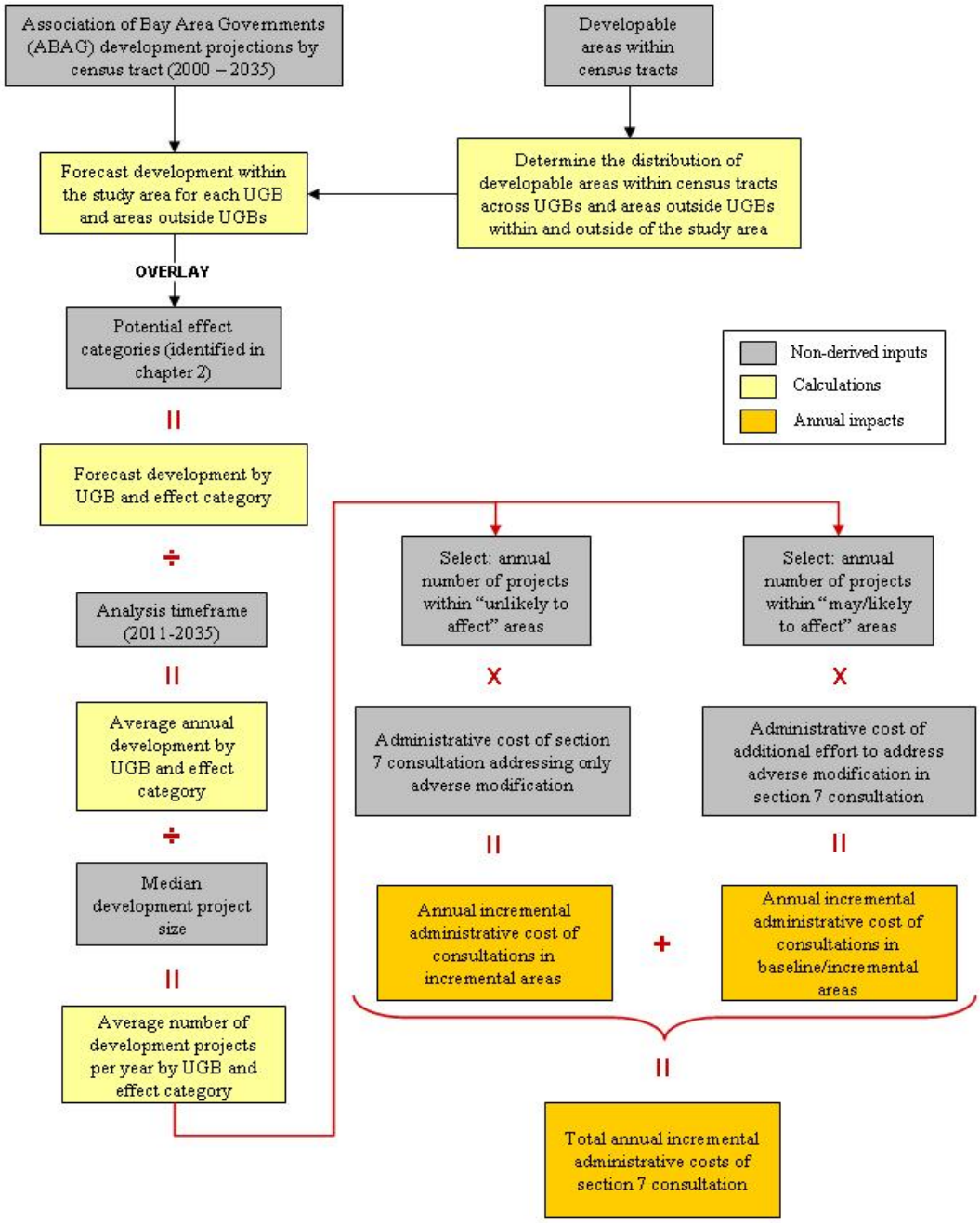
3.1.1 METHODS USED TO FORECAST DEVELOPMENT WITHIN THE STUDY AREA

65. This analysis applies the development projections reported by ABAG in their *Projections 2009 by Census Tract* dataset purchased for Sonoma County.[60] Although local development projections are available for some of the urban areas intersecting the study area (e.g., Santa Rosa, Petaluma, and Rohnert Park), the ABAG dataset is utilized for the entire study area because it provides consistent and current development projections.

[59] Personal communication with the Town of Windsor Planning Department on May 3, 2010 and the City of Cotati on June 9, 2010.

[60] Purchased online at http://store.abag.ca.gov/projections.asp on May 26, 2010.

EXHIBIT 3-2 GENERAL ANALYTIC APPROACH USED TO QUANTIFY INCREMENTAL IMPACTS TO FORECAST DEVELOPMENT WITHIN THE STUDY AREA[61, 62]



[61] Developable areas are defined as vacant areas zoned for development inside and outside of urban growth boundaries.

[62] Non-derived inputs refer to values used in the development analysis that IEc received from third party sources (i.e., did not derive through calculations).

66. The ABAG dataset provides residential and commercial development projections in terms of developed acres within Census tracts.[63] ABAG bases its projections on current zoning data, population forecasts, and direct communication with urban areas and counties to determine current land uses (i.e., areas that have already been developed). Development projections are updated every two years. The ABAG projections applied in this analysis were developed in 2009.[64]

67. The analytic approach used to distribute census tract-level development projections across the study area is based upon the assumption that future development activity will occur within developable areas in one of the five UGBs intersecting proposed critical habitat before it occurs outside any UGB. The approach relies on GIS analysis to determine the amount and distribution of developable areas within the study area. Developable areas within the study area are summarized in Exhibits 3-3 and 3-4. The specific steps taken to allocate development projections to the UGBs intersecting the study area and the areas outside UGBs are detailed below.

EXHIBIT 3-3 SUMMARY OF DEVELOPABLE AREAS WITHIN UGBS AND AREAS OUTSIDE UGBS

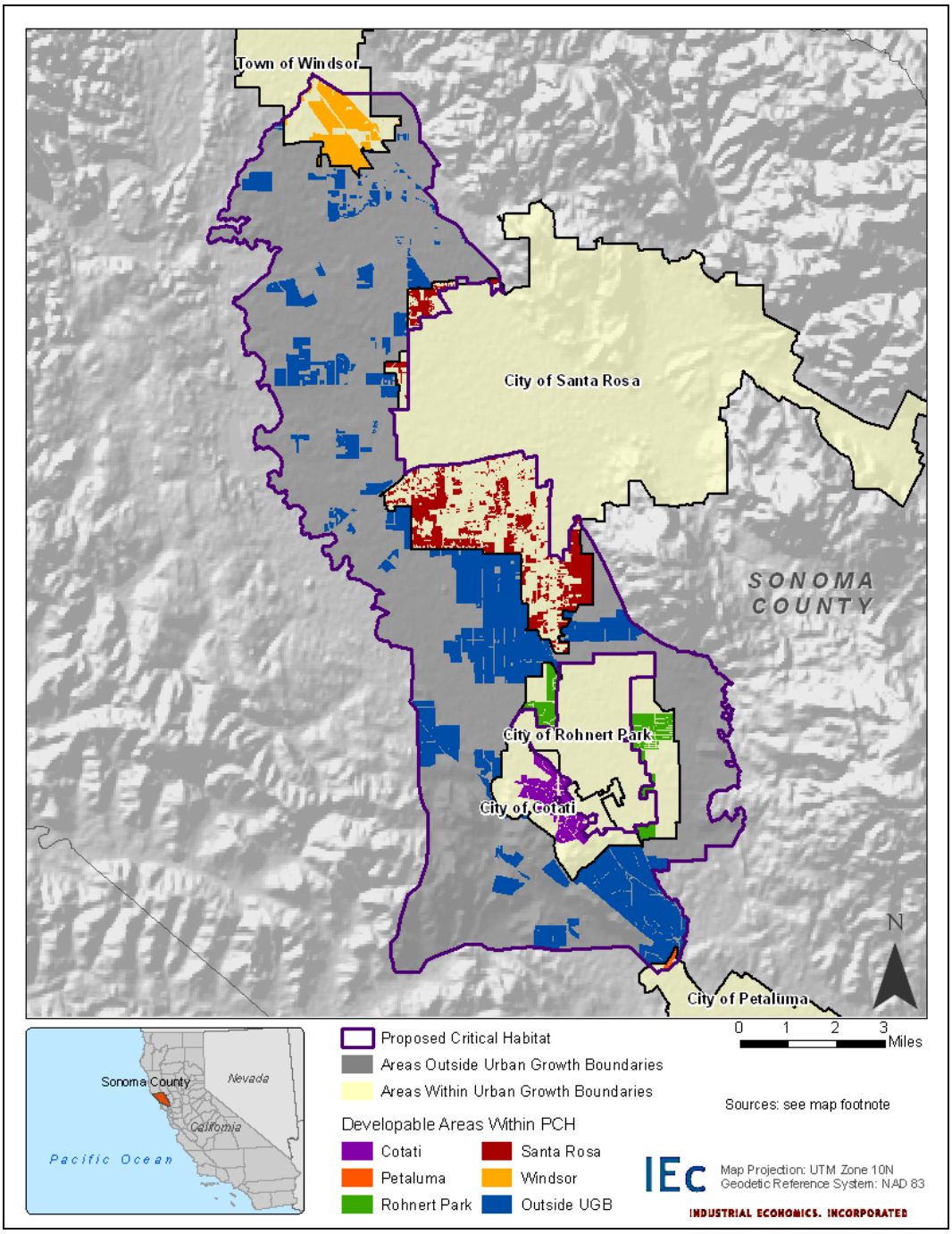
REGION	DEVELOPABLE AREAS (ACRES)
Cotati	589
Petaluma	34
Rohnert Park	708
Santa Rosa	2,033
Windsor	904
Outside UGB	8,013
Overall	**12,281**

Sources:
City of Santa Rosa. 2009. Existing Land Use (vector digital data). Updated December 31, 2009.
City of Rohnert Park. 2009. RP Zoning (vector digital data). Updated July 21, 2009.
Sonoma County. 2010. General Plan 2020 Land Use by Area (vector digital data). Downloaded from Sonoma County Active Map in April 2010.
Zoning data for Cotati, Petaluma, and Windsor were digitized using paper maps: City of Cotati. 2010. Zoning Map. Downloaded from http://ci.cotati.ca.us/sections/departments/commdev.cfm in June 2010; Petaluma. Petaluma General Plan 2025 Land Use. Downloaded from http://cityofpetaluma.net/cdd/plan-zoning.html in June 2010; and, Town of Windsor. Zoning Map. Downloaded from http://www.ci.windsor.ca.us/index.aspx?NID=198 in June 2010.
Sonoma County. 2009. City Urban Growth (vector digital data). Updated June 23, 2005.

[63] An acre is considered developed in the ABAG dataset if development within the acres meets the maximum allowable development according to current land use and zoning data.

[64] Personal communication with the Association of Bay Area Governments on July 7, 2010.

EXHIBIT 3-4 DISTRIBUTION OF DEVELOPABLE AREAS WITHIN THE STUDY AREA BY UGB[65]



[65] See Exhibit 3-3 for map sources.

1. Within each census tract intersecting proposed critical habitat, determine the distribution of developable areas within UGBs across areas inside and outside of the study area (i.e., within UGB-inside proposed critical habitat, within UGB-outside proposed critical habitat).[66]
2. Applying the distribution of developable areas estimated in step one assign projected development to areas inside and outside the study area within each UGB (assuming that development will occur evenly across developable areas within UGBs; in reality, some areas are more likely to be developed than others, however, insufficient information exists to predict exactly where development will occur within developable areas inside UGBs).
3. Verify that the number of acres of development assigned to each UGB area inside and outside the study area does not exceed the total number of developable acres for the area. If assigned development does exceed available developable areas determine the difference between acres of assigned development and total developable acres.
4. Within each census tract from step one, determine the distribution of developable areas outside UGBs across areas inside and outside the study area (i.e., outside UGBs-inside proposed critical habitat, outside UGBs-outside proposed critical habitat).
5. Applying the distribution estimated in step four, assign forecast development exceeding available developable acres within UGBs to areas outside UGBs inside and outside the study area.
6. Verify that the number of acres of development assigned to areas outside UGBs does not exceed the total number of developable acres outside UGBs.[67]

3.1.2 FORECAST DEVELOPMENT WITHIN THE STUDY AREA

68. The development forecast to occur within the study area between 2011 and 2035 (resulting from the completion of steps one through six above) is summarized by UGB in Exhibit 3-5. In order to convert total forecast development (2011 to 2035) to annual development, forecast development totals are divided by the number of years in the analysis timeframe (25 years).[68] Forecast annual development is divided by the median development project size, 4.7 acres, identified from the section 7 consultation history. The largest amount of development (453 acres total or 3.86 projects annually) is forecast

[66] For the purposes of this analysis, developable areas are defined as undeveloped parcels within areas either zoned for development or where landuse codes allow for development.

[67] The number of acres of development assigned to areas outside UGBs is not expected to exceed the total number of developable acres outside UGBs as this would indicate that ABAG development projections exceed developable areas. Indeed, Step 6 did not result in any instances where assigned development exceeds total developable areas. There are, however, four census tracts where assigned development within UGBs exceeds developable areas within UGBs, but no areas are considered developable outside of UGBs. This incongruence is considered to be a product of differences in the datasets applied (ABAG development projections combined with local zoning/landuse data) and poor information on previously developed areas. The projected development exceeding developable areas within UGBs is, therefore, not included in the development forecast.

[68] Methodology is based on the assumption that future development will occur evenly throughout the analysis timeframe. In reality, total development will likely vary between years. However, insufficient information exits to predict specific development amounts for each year in the analysis timeframe.

to occur in Santa Rosa. Relatively large amounts of development are also forecast to occur in Rohnert Park and the Town of Windsor. The smallest amount of development is forecast to occur in Petaluma, mainly because only a small portion of the Petaluma UGB falls within the study area. The distribution of forecast development within the study area is presented in Exhibit 3-6.

EXHIBIT 3-5 FORECAST TOTAL AND ANNUAL DEVELOPMENT AND ANNUAL DEVELOPMENT PROJECTS BY UGB

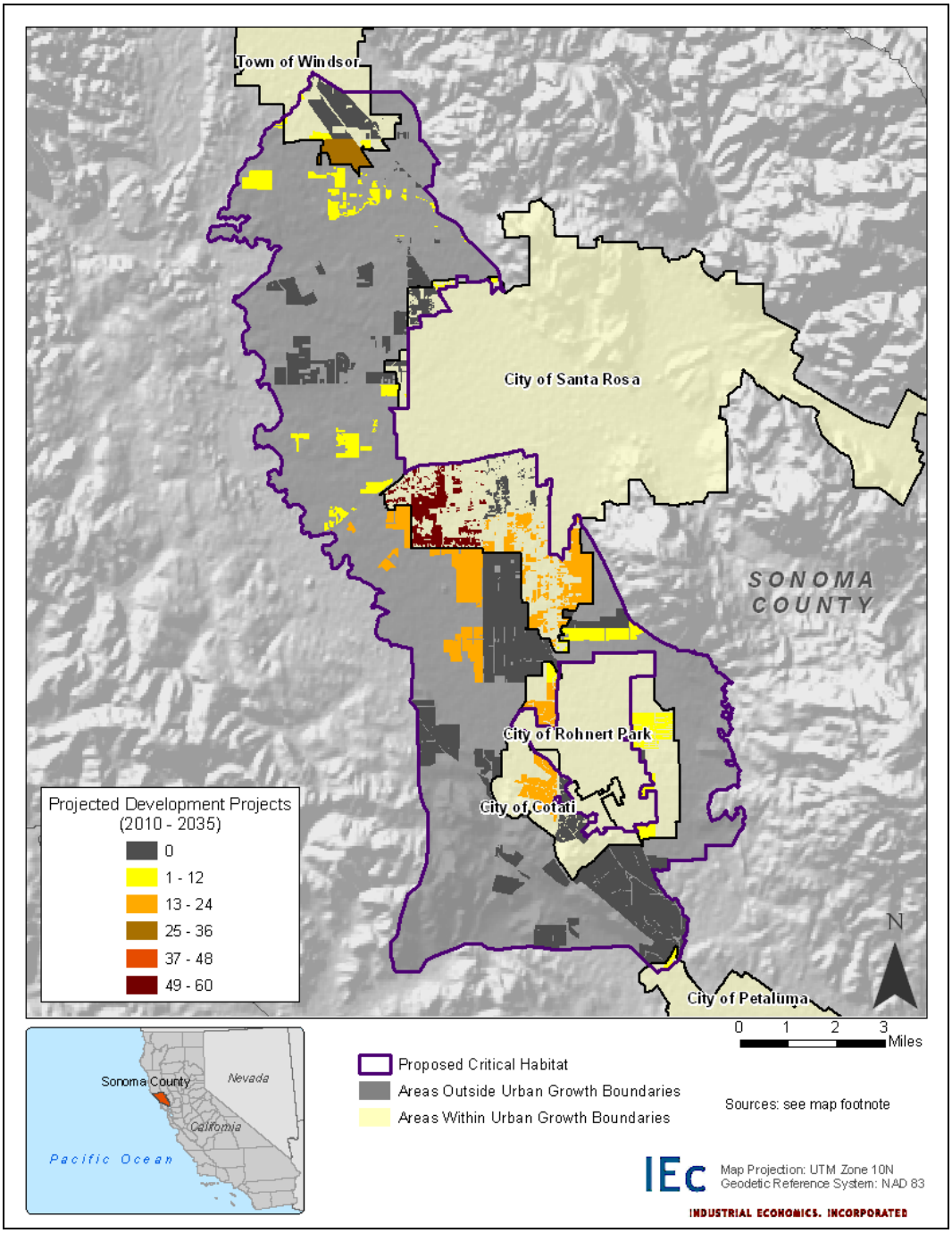
REGION	TOTAL PROJECTED DEVELOPMENT	ANNUAL PROJECTED DEVELOPMENT	ANNUAL NUMBER OF DEVELOPMENT PROJECTS
Cotati	60	2	0.51
Petaluma	18	1	0.15
Rohnert Park	105	4	0.89
Santa Rosa	453	18	3.86
Windsor	175	7	1.49
Outside UGB	132	5	1.13
Total	**943**	**38**	**8.02**

Sources:
See Exhibit 3-3 for sources used to generate developable areas.
Association of Bay Area Governments. 2009. Projections 2009 by Census Tract. Purchased online at http://store.abag.ca.gov/projections.asp on May 26, 2010.
Environmental Systems Research Institute, Inc. 2004. U.S. Census Tracts (SDC feature database).

3.2 BASELINE IMPACTS TO DEVELOPMENT

69. As described in Chapter 2, baseline impacts stem from conservation measures applied to avoid jeopardy and take of the CTS as well as any other conservation measures unrelated to the designation of critical habitat. Potential baseline impacts to development stem from two main sources: 1) minimization and mitigation measures applied as part of the section 404 permit process pursuant to the CWA; and, 2) measures taken to avoid jeopardy of the CTS as part of section 7 consultation. Potential impacts associated with both these causes are described in greater detail below.

EXHIBIT 3-6 DISTRIBUTION OF FORECAST TOTAL DEVELOPMENT WITHIN THE STUDY AREA BY UGB[69]



[69] See exhibit 3-5 for map sources.

3.2.1 CONSERVATION MEASURES RELATED TO 404 PERMITS

70. Section 404 of the CWA requires parties to obtain a permit from the Corps prior to discharging dredge or fill material into "water of the United States."[70] As part of the section 404 permit process, the Corps reviews the potential effects of the proposed action on plant and animal populations and recommends efforts to avoid adverse effects to these populations in addition to the wetlands themselves.[71] Any costs related to conservation measures required by the Corps as part of the section 404 permit process, either for CTS specifically or for wetlands in general, that may benefit CTS and its habitat, are considered baseline impacts.

71. As described in the Programmatic, development project proponents requiring a section 404 permit are required to implement minimization and mitigation measures to limit potential project effects on the CTS and its habitat.[72] Minimization and mitigation requirements vary among development projects. Potential minimization and mitigation requirements are detailed below.

CTS Minimization Measures

72. The specific CTS minimization measures implemented during development projects depend on project size, nature, and location relative to CTS occurrence and breeding habitat.[73] In general, minimization measures for development projects may include the measures presented in Exhibit 3-7. While other measures may be implemented (e.g., speed limits, the prohibition of pets, prompt trash removal), such measures are unlikely to increase project costs. Given that the specific minimization measures implemented during development projects vary on a project-by-project basis, the total cost of minimizing the effects of development on the CTS varies by project.

[70] U.S. Code. Title 33, 1344.

[71] 40 CFR Part 230.75.

[72] U.S. Fish and Wildlife Service to U.S. Army Corps of Engineers. Programmatic Biological Opinion (Programmatic) for U.S. Army Corps of Engineers (Corps) Permitted Projects that May Affect California Tiger Salamander and Three Endangered Plant Species on the Santa Rosa Plain, California (Corps File Number 223420N). 81420-2008-F-0261. November 9, 2007.

[73] Based on a review of the section 7 consultation history and personal communication with Wiemeyer Ecological Sciences (a third party biological consulting agency hired by developers to assist in the environmental permitting process) on July 8, 2010.

EXHIBIT 3-7 POTENTIAL MINIMIZATION MEASURES AND ASSOCIATED COSTS

MINIMIZATION MEASURE	ASSOCIATED COST	UNIT
Construction of exclusion fencing around the project area to prevent the CTS from entering the development site	$500	Per acre
Have a qualified biologist train construction workers on CTS identification prior to the start of work	$1,000	Per project
Have a qualified biological monitor present on the project site during ground disturbing activities	$5,000 - $8,000; $6,500 mid-point	Per project
Limit ground disturbing activities to the dry season (April 15 through October 15)	N/A[1]	N/A
If the CTS is present on the project site, allow for passive relocation or actively trap and translocate CTS individuals off the project site	$1,000 - $2,000 (passive relocation); $1,000 - $5,000 (active trapping and translocation)[2]	Per project

Source: Written communication with Wiemeyer Ecological Sciences (a third party biological consulting agency hired by developers to assist in the environmental permitting process) on July 13, 2010.

Notes:

This analysis assumes that developers are aware of the restriction on ground disturbing activities outside the dry season because of its inclusion in the Programmatic section 7 consultation for Corps permitted projects. Developers, therefore, will plan around the restriction to avoid costly project delays.

Cost of active trapping and translocation assumes that there are between two and ten salamanders are translocated per development project.

CTS Mitigation Measures

73. The mitigation requirements for the CTS are defined by the Service in its Programmatic consultation with the Corps. Mitigation ratios range from 0.2:1 to 3:1 depending on a project's proximity to CTS occurrence or breeding habitat. CTS mitigation ratios are presented in Exhibit 3-8 along with a description of each ratio's applicable area. The distribution of mitigation requirements within the study area is presented in Exhibit 3-9.

74. The map presented in Exhibit 3-9 was created using data on mitigation ratio areas provided by the California Department of Fish and Game. The Department of Fish and Game in conjunction with the Service developed the mitigation areas based on CTS occurrence and breeding locations in 2005.[74] The mitigation areas presented in Exhibit 3-9, therefore, are not up-to-date with current CTS occurrences and breeding sites. This analysis presents mitigation ratios defined according to 2005 data. The mitigation requirements discussed in this section are included only to provide a qualitative description of potential baseline impacts of CTS conservation. To the extent that mitigation requirements differ from those presented in this section based on updated CTS occurrence and breeding site data, baseline impacts of CTS conservation will differ

[74] Personal communication with Tracy Love, Region 3 GIS Coordinator, California Department of Fish and Wildlife, on April 28, 2010.

accordingly. Differences in mitigation areas, however, will not affect the incremental impacts reported in this analysis as incremental impacts do not stem from CTS mitigation.

EXHIBIT 3-8 CTS MITIGATION RATIOS AND APPLICABLE AREAS

RATIO	APPLICABLE AREA
3:1	Within 500 feet of known CTS breeding site
2:1	Greater than 500 feet and within 2,200 feet of a known breeding site, and beyond 2,200 feet from a known breeding site, but within 500 feet of an adult CTS occurrence
1:1	Greater than 2,200 feet and within 1.3 miles of a known CTS breeding site
0.2:1	Greater than 1.3 miles from a known CTS breeding site and greater than 500 feet from an adult CTS occurrence

Source:
U.S. Fish and Wildlife Service to U.S. Army Corps of Engineers. Programmatic Biological Opinion (Programmatic) for U.S. Army Corps of Engineers (Corps) Permitted Projects that May Affect California Tiger Salamander and Three Endangered Plant Species on the Santa Rosa Plain, California (Corps File Number 223420N). 81420-2008-F-0261. November 9, 2007.

75. In order to meet relevant mitigation requirements, project proponents are able to purchase mitigation credits at Service-approved mitigation banks or develop their own mitigation area. The cost of purchasing mitigation credits is expected to be very similar to the cost of establishing a new mitigation area (given that the costs of establishing a mitigation area are built into the cost of a mitigation credit). Establishing a new mitigation area, however, may result in a two-year project delay, whereas mitigation credits can be purchased at will from approved mitigation banks resulting in fewer project delays.[75]

76. This analysis assumes, therefore, that project proponents will always purchase credits from mitigation banks rather than creating their own mitigation areas. This assumption is contingent upon there being sufficient mitigation credits available to offset forecast development.

77. The amount of required mitigation is estimated by overlaying forecast development (as presented in Exhibit 3-6) with the distribution of mitigation requirements presented in Exhibit 3-9.[76] Not all forecast development is expected to impact the CTS and its habitat. Based on a review of past development projects requiring section 7 consultation, 80 percent of future development project areas are expected to require CTS mitigation. Exhibit 3-10 presents forecast development by applicable mitigation ratio along with the

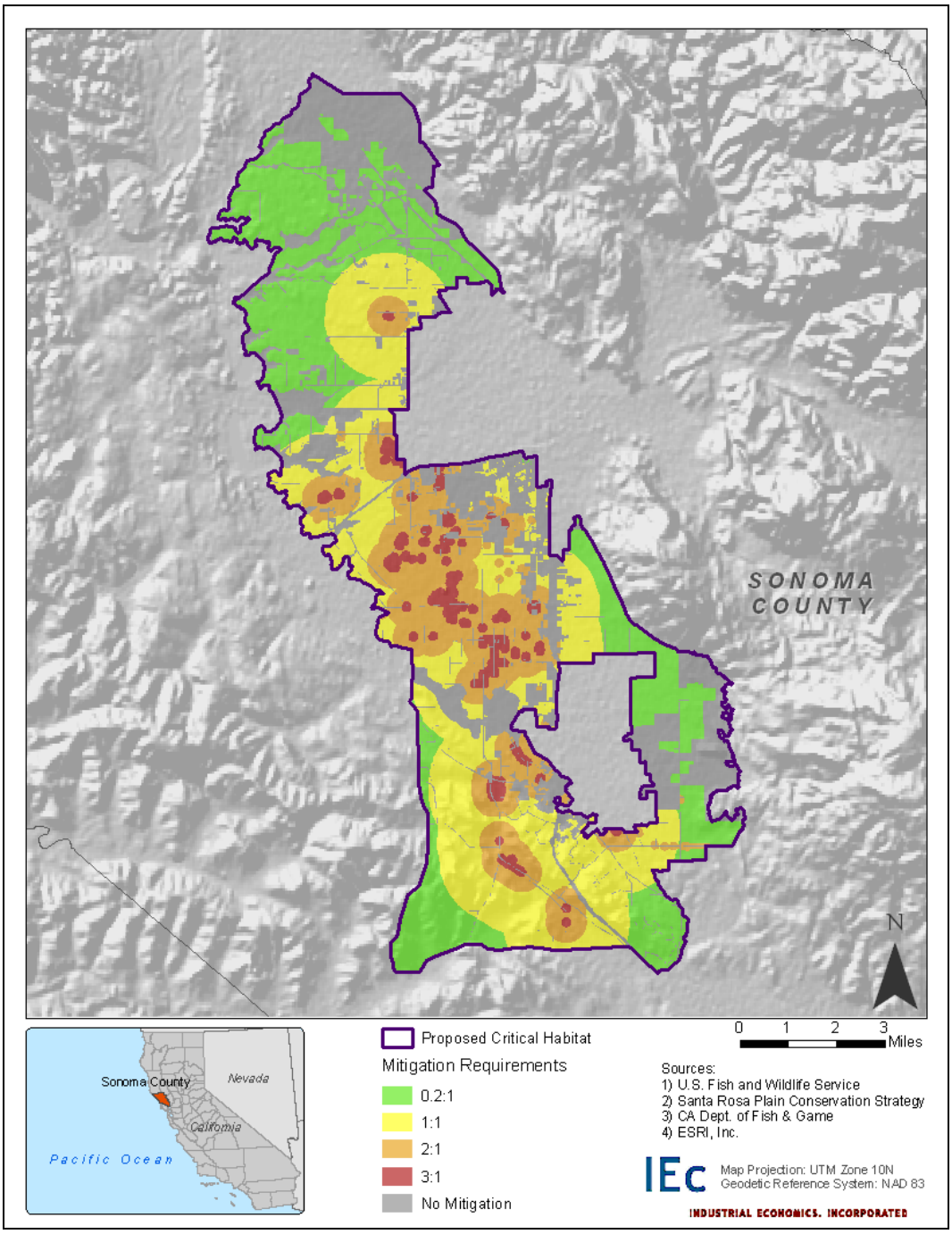
[75] Mitigation site development frequently requires wetland restoration and habitat enhancement and always requires Service approval. In total, establishing a new mitigation area (from the purchase of land through Service mitigation site approval) takes an average of two years. Based on personal communication with several mitigation bank managers and the Service mitigation bank specialist.

[76] To the extent that mitigation requirements change according to updated CTS occurrence and breeding site data, the amount of required mitigation for forecast development will also change. Any changes in required mitigation will alter baseline impacts, not incremental impacts.

total mitigation required to offset forecast development within each UGB. In total, 920 acres of mitigation are expected to be required to offset forecast development within the study area between 2011 and 2035. The cost of CTS mitigation credits sold recently ranges from $100,000 to $130,000 per acre.[77]

[77] Based on personal communication with: the Hazel Mitigation Bank on June 21, 2010; the Carinalli-Todd Mitigation Bank on June 28, 2010; Monk and Associates (biological consultant) on July 7, 2010; Wiemeyer Ecological Sciences (biological consultants) on July 9, 2010; and the Service mitigation banking specialist on July 7, 2010.

EXHIBIT 3-9 DISTRIBUTION OF MITIGATION REQUIREMENTS WITHIN THE STUDY AREA[78]



[78] Mitigation requirements presented are based on 2005 CTS occurrence and breeding site data.

EXHIBIT 3-10 FORECAST TOTAL DEVELOPMENT BY APPLICABLE MITIGATION RATIO AND UGB AND TOTAL REQUIRED MITIGATION[79]

REGION	PROJECTED DEVELOPMENT BY REQUIRED MITIGATION CATEGORY						TOTAL MITIGATION REQUIRED
	NO MITIGATION REQUIRED	0.2:1	1:1	2:1	3:1	TOTAL	
Cotati	0	0	8	50	2	60	90
Petaluma	0	18	0	0	0	18	3
Rohnert Park	0	46	55	4	0	105	58
Santa Rosa	2	36	97	258	60	453	641
Windsor	166	9	0	0	0	175	2
Outside UGB	12	33	33	42	12	132	127
Total	**180**	**143**	**193**	**354**	**73**	**943**	**920**

3.2.2 CONSERVATION MEASURES TO MINIMIZE TAKE OF CTS AND TO AVOID JEOPARDY

78. As part of the section 7 consultation process, the Service is able to request reasonable and prudent measures to avoid jeopardy of the CTS if the Service determines that the project will adversely affect the species. The incremental memo states that:

> "In general, to avoid adverse effects to Sonoma CTS, project proponents should avoid wetlands and upland habitat proximate to wetlands whenever feasible…If avoidance is not feasible we (the Service) work with project proponents to develop measures to minimize the effect of a project on the Sonoma CTS."[80]

Specifically, for projects where adverse effects to the CTS are likely, the Service indicates that it will work with project proponents during section 7 consultation to reduce or realign the project area to avoid wetland areas and reduce project effects on the CTS.[81] The Service may also require additional minimization measures beyond those required for a section 404 permit.

79. The Service has not reached a jeopardy finding for the CTS on a development project to date.[82] While it is possible that a jeopardy finding may be reached in the future, the specific criteria that might lead to such a determination are unclear. This analysis, therefore, notes the potential for additional baseline impacts stemming from measures

[79] Mitigation requirements presented are based on 2005 CTS occurrence and breeding site data. To the extent that mitigation requirements change according to updated CTS occurrence and breeding site data, the amount of required mitigation for forecast development will also change. Any changes in required mitigation will alter baseline impacts, not incremental impacts.

[80] U.S. Fish and Wildlife Service to Industrial Economics, Incorporated. August 4, 2010. "Comments on how the Draft Economic Analysis Should Estimate Incremental Costs for the California Tiger Salamander (*Ambystoma californiense*), Sonoma Distinct Population Segment, Re-proposed Critical Habitat Designation."

[81] Personal communication with the Service on July 20, 2010.

[82] Based on a review of the section 7 consultation history and personal communication with the Service on July 20, 2007.

required by the Service to avoid jeopardy, but does not forecast the occurrence of such impacts in the future.

3.3 INCREMENTAL IMPACTS TO DEVELOPMENT

80. Incremental impacts are impacts incurred solely due to the designation of critical habitat. This section identifies potential incremental impacts to forecast development; describes the methodology applied to estimate such incremental impacts; and finally, reports incremental impacts to forecast development.

3.3.1 IDENTIFYING INCREMENTAL IMPACTS

81. In general, incremental impacts stem from measures taken to avoid the adverse modification of critical habitat associated with section 7 consultation. Within proposed critical habitat, the CTS may be present or absent from a given project area. As described in their Incremental Memo, the Service expects measures implemented to avoid jeopardy (i.e., baseline conservation measures) to be sufficient to avoid the adverse modification of critical habitat when the CTS is present in the project area.[83] Incremental impacts, therefore, are limited to the additional administrative cost of addressing adverse modification during section 7 consultation. For projects where the CTS is absent from the project area, the Service may request measures specifically to avoid the adverse modification of critical habitat. The Service expects such measures to be similar to the measures potentially requested to avoid a jeopardy finding, as described in section 3.2.2. Specifically, the Service may require: "1) modifying the development project such that a lower level of land use would occur; 2) relocating the project to avoid suitable wetland areas and associated upland areas."[84]

82. The Service considers several factors in its determination of adverse modification. At least some of these factors overlap with factors considered as part of a jeopardy determination. As stated in the Incremental Memo: "a determination of adverse modification would likely be coincident to a jeopardy determination (when the CTS is present) for the same action because we (the Service) typically estimate take for this species (the CTS) in terms of acres of aquatic and upland occupied habitat."[85]

83. Given that conditions leading to a jeopardy finding coincide with conditions leading to an adverse modification finding, this analysis would ideally rely upon past development projects for which a jeopardy finding was reached to determine the types of development projects that may adversely modify critical habitat in the future. As noted in section 3.2.2, however, no development project has led to a jeopardy finding to date. It is not

[83] U.S. Fish and Wildlife Service to Industrial Economics, Incorporated. August 4, 2010. "Comments on how the Draft Economic Analysis Should Estimate Incremental Costs for the California Tiger Salamander (*Ambystoma californiense*), Sonoma Distinct Population Segment, Re-proposed Critical Habitat Designation."

[84] Ibid.

[85] U.S. Fish and Wildlife Service to Industrial Economics, Incorporated. August 4, 2010. "Comments on how the Draft Economic Analysis Should Estimate Incremental Costs for the California Tiger Salamander (*Ambystoma californiense*), Sonoma Distinct Population Segment, Re-proposed Critical Habitat Designation."

possible, therefore, to estimate the frequency with which a jeopardy finding will be reached in the future.[86] Further, because the Service has not reached a jeopardy finding in the past, the measures that would be requested to avoid jeopardy beyond those implemented as part of the section 404 permit have not been evaluated. It should be noted that these measures would only be considered incremental impacts in cases where the development project is:

- Within an unlikely to affect are as defined under the Programmatic or
- Within a likely/may affect area where CTS occupancy is unknown, the project proponent conducts a survey for the CTS, and the CTS is not located.

Given the uncertainty regarding the potential effects of future development projects on critical habitat, this analysis does not forecast impacts associated with additional conservation measures to avoid the adverse modification of critical habitat for projects where the CTS is absent. Rather, forecast incremental impacts are limited to the administrative costs of addressing adverse modification during section 7 consultation. The bounding analysis described in chapter 2, therefore, does not apply to the estimation of incremental impacts to development.

3.3.2 METHODS USED TO QUANTIFY INCREMENTAL IMPACTS

84. As described in Chapter 2, the administrative costs of section 7 consultation attributable to designation of critical habitat (i.e., incremental administrative costs) depend on the location of the development project relative to the Programmatic effect categories. Specifically, any project located within areas classified as "may adversely affect CTS" or "likely to adversely affect CTS" in the Programmatic would require section 7 consultation absent critical habitat. Incremental administrative costs of section 7 consultation for projects in these areas, therefore, are limited to the additional effort to address adverse modification ($5,000 per consultation). Projects located within areas classified as "unlikely to adversely affect CTS" would not require section 7 consultation absent critical habitat. Thus, incremental administrative costs in these areas include the full consultation cost ($15,000).[87]

85. In order to estimate incremental administrative costs the development projections presented in Exhibits 3-5 and 3-6 must be allocated across the effect categories identified in the Programmatic. Exhibit 3-11 presents the number of annual forecast development projects within each of three effect categories (identified in chapter 2) within each UGB intersecting the study area and within areas outside UGBs. The number of development projects within each category and UGB area are estimated by overlaying Exhibits 3-6 and 2-4. Incremental impacts are estimated by summing the product of: 1) the total number of projects where the type of impact is identified as "Baseline & Incremental" and the additional administrative cost of addressing adverse modification; and, 2) the total

[86] Personal communication with the Service on July 20, 2010.

[87] U.S. Fish and Wildlife Service to Industrial Economics, Incorporated. August 4, 2010. "Comments on how the Draft Economic Analysis Should Estimate Incremental Costs for the California Tiger Salamander (*Ambystoma californiense*), Sonoma Distinct Population Segment, Re-proposed Critical Habitat Designation."

number of projects where the type of impact is identified as "Incremental" and the total cost of a section 7 consultation addressing only adverse modification. Incremental impacts to forecast development are presented in the following section.

EXHIBIT 3-11 NUMBER OF FORECAST ANNUAL DEVELOPMENT PROJECTS BY EFFECT CATEGORY AND UGB

EFFECT CATEGORY	TYPE OF IMPACT	URBAN GROWTH BOUNDARIES						TOTAL
		COTATI	PETALUMA	ROHNERT PARK	SANTA ROSA	WINDSOR	OUTSIDE UGBs	
No Effect	None	0.33	0.00	0.52	0.27	0.66	0.00	1.78
Unlikely to Affect	Incremental	0.00	0.00	0.00	0.02	0.78	0.01	0.81
May/Likely to Affect	Baseline & Incremental	0.18	0.15	0.37	3.58	0.04	1.11	5.43
Total		**0.51**	**0.15**	**0.89**	**3.86**	**1.49**	**1.13**	**8.02**

3.3.3 QUANTIFIED INCREMENTAL IMPACTS

86. This section presents the present value of incremental impacts to forecast development stemming from the administrative cost of section 7 consultation. Incremental impacts to future development within the study area are estimated to total $441,000 (discounted at 7 percent), which is equivalent to $37,900 in annualized impacts (discounted at 7 percent) over the analysis timeframe. The present and annualized values of incremental impacts are presented for each UGB intersecting the study area and areas outside UGBs in Exhibit 3-12.

EXHIBIT 3-12 FORECAST INCREMENTAL IMPACTS TO DEVELOPMENT (2011 - 2035, 7 PERCENT DISCOUNT RATE, 2010 DOLLARS)

REGION	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
Cotati	$10,200	$878
Petaluma	$8,310	$713
Rohnert Park	$20,900	$1,790
Santa Rosa	$203,000	$17,400
Windsor	$134,000	$11,500
Outside UGB	$64,700	$5,550
Total	**$441,000**	**$37,900**

87. Given that forecast incremental impacts to development are based directly on forecast levels of development, the distribution of impacts presented in Exhibit 11 closely follow the distribution of forecast development presented in Exhibit 5. The greatest impacts to development are forecast to occur in Santa Rosa ($203,000, discounted at seven percent). Development within the Town of Windsor and in areas outside UGBs is also forecast to

incur relatively large impacts. The smallest impacts to development are forecast to occur in Petaluma ($8,310, discounted at seven percent) given that only a small amount of development is forecast to occur within the portion of the Petaluma UGB intersecting the study area (0.15 development projects annually).

3.4 ASSUMPTIONS AND CAVEATS

88. This section describes the key assumptions and caveats underlying the estimates of incremental impacts to development due to the designation of critical habitat for the CTS. Of particular importance, the development analysis does not quantify incremental impacts beyond the cost of addressing adverse modification of critical habitat in section 7 consultation. It is possible that the Service will determine that a future development project is likely to result in adverse modification of critical habitat and request additional conservation measures. As explained above, the likelihood of the Service requesting additional conservation measures is unknown.

89. To the extent that the Service does request additional conservation measures to avoid the adverse modification of critical habitat as part of section 7 consultations on future development projects, this analysis underestimates incremental impacts to development. The probability of the Service requesting additional conservation measures in the future to avoid the adverse modification of critical habitat is considered to be quite low because the CTS is present in the majority of the study area (in which case, additional conservation measures requested would coincide with measures requested to avoid jeopardy, and, as such, are considered baseline).

90. Additional assumptions and caveats are presented in Exhibit 3-13. These assumptions and caveats are not expected to have a significant effect on the estimates of incremental impacts.

EXHIBIT 3-13 SUMMARY OF THE KEY ASSUMPTIONS AND CAVEATS APPLIED IN THE DEVELOPMENT ANALYSIS

ASSUMPTION/CAVEAT	POTENTIAL EFFECT ON IMPACT ESTIMATES
Analysis assumes that development will occur within UGBs prior to occurring outside UGBs (i.e., developable areas within UGBs will be fully built out before any additional development occurs outside of UGBs)	+/-
Analysis assumes that forecast development will occur evenly across developable areas within the study area and across the analysis timeframe (2011 - 2035)	+/-
Analysis assumes that future development will increase to meet current development forecasts, despite the recent economic downturn	+
Forecast of annual number of development projects is based on a 4.7-acre median development project size identified in the section 7 consultation history	+/-
Developable areas in Cotati, Windsor, and Petaluma are based on digitized zoning and land use maps	+/-
+: This assumption may result in an overestimate of actual costs. - : This assumption may result in an underestimate of actual costs. +/-: This assumption has an unknown effect on estimates.	

CHAPTER 4 | POTENTIAL ECONOMIC IMPACTS TO OTHER ACTIVITIES

91. This chapter discusses the economic impacts to other activities potentially resulting from the proposed revised critical habitat designation for CTS. Activities include transportation, utility, agriculture, and mitigation bank establishment. Total present value incremental impacts to these activities is $23,800 ($2,040 annualized impact), using a seven percent discount rate. Details on the impacts to these four sectors are provided in Sections 4.1 through 4.4. This chapter also presents costs associated with reinitiating the Programmatic following the designation of critical habitat for the CTS to address adverse modification in section 4.5.

4.1 TRANSPORTATION ACTIVITIES

92. Future transportation-related costs include various potential impacts to transportation projects across the proposed critical habitat designation. In particular, the Sonoma State Route 116 Roadway Rehabilitation Project, the Proposed Three Highway 101 Lane Widening and Improvement Projects, and the Mark West Creek bridge construction will be discussed.

4.1.1 CALTRANS DISTRICTS

93. CALTRANS maintains and builds highways as well as railroads and mass transit lines for the State of California. Most road projects planned and carried out by CALTRANS involve a Federal nexus through funding from the Federal Highway Administration or from permits required under Section 404 of the CWA. The proposed critical habitat is contained within Sonoma County managed by CALTRANS District 4.

94. CALTRANS maintains a database of current and predicted transportation projects called the California Transportation Investment System (CTIS). CTIS is a GIS-based application created by CALTRANS that displays the current location of planned and "programmed" (i.e., projects with secured funding) transportation projects until 2030. CTIS includes two projects within the proposed critical habitat: widening of Highway 101 and improvements to Route 116. Some segments of the Highway 101 widening project are included in the database as planned projects, while other segments are included as programmed projects. The Route 116 rehabilitation project is included in the database as a planned project.

95. CALTRANS has consulted with the Service on the effects of these projects on the CTS.[88] In 2008, the Service consulted with CALTRANS on three proposed lane widening

[88] Based on a review of the section 7 consultation history provided by the Service on March 12, 2010.

projects along Highway 101. The Service finds that the Highway 101 projects are not likely to jeopardize the continued existence of the CTS. The Service based this decision in part on the fact the proposed projects abide by the guidelines set forth in the Conservation Strategy. Additionally, CALTRANS proposes to implement numerous conservation measures to minimize CTS take.[89] In 2009, the Service consulted with CALTRANS on a rehabilitation project for a section of State Route 116 between Sebastopol and Highway 101 in Cotati. The Service finds that the level of anticipated take associated with the Route 116 Rehabilitation Project is not likely to result in jeopardy to the CTS. Again, the project incorporates the minimization and mitigation measures outlined in the Conservation Strategy.[90] Neither of these consultations considers the adverse modification of critical habitat because none was designated at the time of consultation. As described in Chapter 2, CALTRANS will have to re-initiate consultation to address adverse modification.

96. The re-initiation of consultation for these projects is not expected to result in additional project modifications. The Service states that where CTS presence is known or assumed, "project descriptions that are modified to minimize impacts to individuals will often also minimize impacts to critical habitat."[91] The Service goes on to state that for such projects incremental costs will likely be limited to administrative costs.[92] This analysis includes the administrative cost to re-initiate formal consultation, $10,000, for the two CALTRANS projects as incremental impacts of the proposed designation.[93] These costs are incurred in the year that critical habitat is expected to be finalized, 2011, and are divided evenly among regions for the Highway 101 Widening Project, and split between Cotati and outside the UGBs for the Route 116 Rehabilitation Project, as these are the respective affected areas for each project.

97. An additional project by CALTRANS was listed in the Metropolitan Transportation Commission's (MTC) 2011 Transportation Improvement Program (TIP). CALTRANS plans to construct a new two-lane bridge called the Mark West Creek Bridge in Santa Rosa. Funding for this project is expected in fiscal year 2014/2015.[94] This project is located in the no affect, unlikely to affect, and may/likely to affect areas. Because this project is partially located in the unlikely to affect and the may/likely to affect areas,

[89] U.S. Fish and Wildlife Service, April 15, 2008. 81420-2008-F-0733-2. Amendment to the Biological Opinion on the Effects of the Proposed Three Highway 101 Land Widening and Improvement Projects in Sonoma County, California.

[90] U.S. Fish and Wildlife Service, April 16, 2009. 81420-2008-F-1220-3. Biological Opinion for the Sonoma State Route 116 Rehabilitation Project, Sonoma County, California on the Endangered California Freshwater Shrimp; Endangered Sonoma County Distinct Population Segment of the California Tiger Salamander; Endangered Sebastopol Meadowfoam, Endangered Sonoma Sunshine, and Endangered Burke's Goldfields.

[91] U.S. Fish and Wildlife Service to Industrial Economics, Incorporated. August 4, 2010. "Comments on how the Draft Economic Analysis Should Estimate Incremental Costs for the California Tiger Salamander (*Ambystoma californiense*), Sonoma Distinct Population Segment, Re-proposed Critical Habitat Designation."

[92] *Ibid*.

[93] Derivation of administrative costs explained in detail in Chapter 2, in particular Exhibit 2-4.

[94] Metropolitan Transportation Commission. July 14, 2010. Transit Project Listings, Draft 2011 TIP. Viewed September 13, 2010. http://mtc.ca.gov/funding/tip/DRAFT_2011/Project_Listings_Draft.pdf

CALTRANS will need to consult with the Service on this project. Given the potential presence of CTS in the may/likely to affect areas, the Service requires section 7 consultation in these areas regardless of whether or not the species is present. As such, only the additional administrative costs of addressing adverse modification in section 7 consultation for this project will be considered incremental. This analysis includes the administrative cost associated with the additional effort necessary to address adverse modification, $5,000, as an incremental impact in Santa Rosa. This cost is expected to be incurred in 2014.

98. As described in Chapter 3, given the lack of precedent and the uncertainty regarding the potential effects of future transportation projects on critical habitat, this analysis does not forecast impacts associated with conservation measures to avoid the adverse modification of critical habitat for projects where the CTS is absent. If impacts associated with conservation measures do occur, they will be considered incremental if the project proponent chooses to survey for the CTS and the survey does not locate the species.[95]

4.1.2 OTHER TRANSPORTATION AUTHORITIES

99. Authorities other than CALTRANS are also involved in transportation projects. The Sonoma County Transportation Authority (SCTA) is the agency responsible for planning and programming countywide transportation related issues. SCTA secures funds, oversees projects and does long term planning, serving as the coordinating and advocacy agency for transportation funding. MTC is responsible for planning, coordinating and financing transportation projects in the nine counties in the San Francisco Bay Area.

100. The authorities outside CALTRANS have a variety of projects planned within the proposed critical habitat at the city, county and state levels. The projects listed in SCTA's Comprehensive Transportation Plan for Sonoma County and the MTC's Transportation 2035 Plan do not have estimated start dates or funding sources. As such, projects at the city and county level are not included in the economic analysis. Projects include lane widening, rehabilitation, reconstruction, road extensions, bridge replacements, pedestrian and bicycle facilities, traffic signal installation, corridor improvements, traffic calming, additions of overcrossings and undercrossings, and other improvements.

101. The MTC 2011 TIP includes projects in the near immediate future. This source was consulted, but ultimately no projects in addition to the Mark West Bridge construction project being undertaken by CALTRANS were identified in the study area.

4.1.3 FORECAST INCREMENTAL IMPACTS TO TRANSPORTATION

102. Exhibit 4-1 presents total estimated incremental impacts to transportation activities by region. Incremental impacts include administrative costs of consultation. Consultation may result in additional project modifications, but these modifications are uncertain and not quantified at this time.

[95] This project is located in a may/likely to affect area where the presence of CTS is unknown. See Chapter 2 for a complete discussion of section 7 project modification impacts.

EXHIBIT 4-1 ESTIMATED INCREMENTAL IMPACTS TO TRANSPORTATION ACTIVITIES (2011 – 2035, 2010 DOLLARS, SEVEN PERCENT DISCOUNT RATE)

REGION	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
Cotati	$6,230	$535
Petaluma	$1,560	$134
Rohnert Park	$1,560	$134
Santa Rosa	$5,370	$461
Windsor	$1,560	$134
Outside UGB	$6,230	$535
Total	**$22,500**	**$1,930**

Notes:
Values are rounded to three significant figures. Totals may not sum due to rounding.

4.2 UTILITY ACTIVITIES

103. This section covers potential impacts to PG&E. PG&E provides energy services to 14 million people in a 70,000 square-mile service area. Services span 47 of 58 California counties through northern and central California.[96] Electric and gas infrastructure already exists within the proposed critical habitat.

104. PG&E undertakes operation and maintenance activities within the proposed critical habitat area. PG&E historically and currently carries out these activities following Conservation Strategy guidelines. Planned PG&E activities involve ongoing gas and electrical transmission and distribution upgrades to support the developing Santa Rosa region. In addition, PG&E expects that new facilities will be needed in the future. [97]

105. Although there is no history of PG&E consulting with the Service on their activities within the study area, they may have to consult in the future to obtain needed permits under Section 404 of the CWA. PG&E is currently developing an HCP which includes coverage for the CTS.[98] If an HCP is developed and approved by the Service then consultation on individual activities covered by the HCP would not be necessary. The HCP is likely to cover PG&E's routine maintenance activities. As described in Chapter 2, under section 10(a)(1)(B) of the Act, an entity may develop an HCP for a listed species in order to meet the conditions for issuance of an incidental take permit. The development and implementation of HCPs is considered a baseline protection for the species and habitat unless the HCP is determined to be precipitated by the designation of critical habitat. In this case, it appears that PG&E began development of their HCP prior

[96] Pacific Gas and Electric website, accessed by http://www.pge.com/includes/docs/pdfs/about/rates/rebateprogrameval/advisorygroup/pubwkshop1_handout2.pdf on September 7, 2010.

[97] Public comment from Pacific Gas and Electric Company, October 19, 2009, Comments on the Proposed Revised Critical Habitat for the California Tiger Salamander.

[98] *Ibid*.

to the proposed designation of critical habitat for the CTS and thus the development of the HCP is considered a baseline impact. The Service will have to perform an intra-agency consultation on this HCP. The administrative cost associated with the additional effort necessary to address adverse modification in this consultation is included as an incremental impact. This cost is divided evenly across regions as no specific information is available on the area covered by the HCP.

106. PG&E may have to consult on activities not covered by the HCP, such as new facility construction. Data are not available on the location and timing of such projects, therefore, potential future costs associated with these projects cannot be estimated.

107. Exhibit 4-2 presents total incremental impacts to utility activities by region. Incremental impacts include administrative costs of consultation. Consultation may result in additional project modifications, but these modifications are uncertain and not quantified at this time.

EXHIBIT 4-2 ESTIMATED INCREMENTAL IMPACTS TO UTILITY ACTIVITIES (2011 – 2035, 2010 DOLLARS, SEVEN PERCENT DISCOUNT RATE)

REGION	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
Cotati	$214	$18
Petaluma	$214	$18
Rohnert Park	$214	$18
Santa Rosa	$214	$18
Windsor	$214	$18
Outside UGB	$214	$18
Total	**$1,290**	**$110**

Notes:
Values are rounded to three significant figures. Totals may not sum due to rounding.

4.3 AGRICULTURE

108. Agricultural activities within the study area are not expected to be affected by the designation of critical habitat for the CTS. Incremental impacts, therefore, are not quantified for agricultural activities. This section describes the potential threats to the CTS and its habitat associated with agricultural activity and describes why agricultural activities are not likely to be impacted by critical habitat designation.

4.3.1 POTENTIAL THREATS ASSOCIATED WITH AGRICULTURAL ACTIVITIES

109. Agricultural activities, such as planting and harvesting crops, are thought to adversely affect CTS. However, where such agricultural activities have occurred over many years they may not impact currently existing CTS habitat. The Proposed Rule notes that agricultural lands do not constitute a barrier to CTS dispersal.[99] The conversion of lands

[99] 74 FR 41662.

to intensive agriculture as described in the August 4, 2004 final listing rule for the CTS is expected to impact CTS habitat, particularly because it involved the initial use of ground disturbing measures that may include including grading, discing, and drainage improvement.[100] The Proposed Rule also identifies the conversion of land to vineyards as an activity that could "compromise the function of vernal pools, swales, ponds, and other seasonal wetlands," thereby reducing CTS habitat.[101]

4.3.2 EFFECT OF CRITICAL HABITAT DESIGNATION ON AGRICULTURAL ACTIVITY

110. Within Sonoma County, grading and drainage improvement for agricultural purposes as well as vineyard and orchard site development require a permit from the Agricultural Commissioner pursuant to the Sonoma County Grading, Drainage, and Vineyard and Orchard Site Development Regulations.[102] In order to receive permit approval, project proponents must ensure the protection of streams, lakes, ponds, and wetlands. Protection measures include:

- Establishing buffer zones around watercourses and wetlands within which ground disturbing activities are prohibited;
- Ensuring that watercourses are not obstructed; and,
- The prohibition of grading, drainage improvement, or vineyard and orchard site development in steeply sloped areas.

111. The implementation of such measures is expected to benefit the CTS by preserving its habitat. Costs associated with implementing measures in order to obtain a grading, drainage improvement, or vineyard and orchard site development permit from the County are considered baseline as such measures would be implemented absent critical habitat. The permitting process is not expected to change following critical habitat designation.[103] Projects receiving a permit from the County are exempt from the CEQA and therefore will not be required to implement additional CTS conservation measures following critical habitat designation pursuant to CEQA.[104]

112. As defined in Part 232 of the CWA, normal farming, silviculture, and ranching activities, including, plowing, seeding, cultivating, minor drainage, and harvesting for the production of food, fiber, and forest products are exempt from section 404.[105] The majority of agricultural activity within the study area, therefore, does not require a section 404 permit and is exempt from the minimization and mitigation requirements described in section 3.2.1 of this report. The exemption of normal farming activities from the 404

[100] 69 FR 47212.

[101] *Ibid*.

[102] Sonoma County Ordinance No. 5819

[103] Personal communication with Sonoma County Planning Office on June 29, 2010.

[104] Sonoma County Ordinance No. 5819

[105] 40 CFR Part 232

permit process negates the potential for section 7 consultation on normal farming activities.

113. If the CTS is present or assumed to be present within areas of agricultural activity, landowners may develop an HCP in order to receive an incidental take permit. In such cases, the Service would conduct an intra-Service section 7 consultation before approving the HCP and incremental impacts associated with the additional administrative cost of addressing adverse modification during the consultation process would be incurred. Any impacts associated with developing and implementing the HCP would be baseline as landowners would incur such costs absent critical habitat. To date, no HCP for agricultural activity has been developed.[106] Further, we are unaware of the development of any future HCPs. This analysis, therefore, does not forecast incremental impacts stemming from intra-Service section 7 consultation on HCPs developed for agricultural activities.

114. The exemption from section 404 does not apply to the conversion of wetland areas to agricultural production.[107] Vineyard conversion, therefore, is not exempt from section 404 if it takes place in a wetland area. Any CTS minimization and mitigation measures required as part of the section 404 process are considered baseline as they would be required absent critical habitat. However, the Service could request additional CTS conservation measures to avoid the adverse modification of critical habitat as part of section 7 consultation triggered by the need for a section 404 permit.

115. The potential for a) the Service to request additional measures to avoid the adverse modification of critical habitat beyond the minimization and mitigation measures implemented as part of the 404 permit process, and, b) such measures to be incremental, is likely quite low. As described in section 3.3.1 of this report, there is no precedent for the Service to request additional conservation measures beyond the minimization and mitigation measures implemented as part of the 404 permit process.[108] Further, if the Service were to request additional conservation measures, such measures would only be considered incremental in unlikely to affect areas (identified in chapter 2) as the same measures would be requested in may/likely to affect areas absent critical habitat.[109] Incremental impacts to agricultural conversion projects within wetland areas, therefore, would likely stem solely from the additional administrative cost of addressing adverse modification during section 7 consultation.

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[106] Based on a review of the section 7 consultation history from 2004 to 2010 and personal communication with the Service on July 20, 2007.

[107] U.S. Army Corps of Engineers. Wetlands and Agriculture: Section 404 of the Clean Water Act and Swampbuster in the Food Security Act. Accessed online at http://www.sac.usace.army.mil/assets/html/regulatory/wetlands/sb.html on September 10, 2010.

[108] Based on a review of the section 7 consultation history from 2004 to 2010 and personal communication with the Service on July 20, 2007.

[109] U.S. Fish and Wildlife Service to Industrial Economics, Incorporated. August 4, 2010. "Comments on how the Draft Economic Analysis Should Estimate Incremental Costs for the California Tiger Salamander (*Ambystoma californiense*), Sonoma Distinct Population Segment, Re-proposed Critical Habitat Designation."

116. The section 7 consultation history contains no past consultations on agricultural conversion projects.[110] Further, communication with the Corps Regulatory Division indicates that no section 404 permit requests for agricultural conversion projects have occurred in the recent past within the study area.[111] This indicates that few agricultural conversion projects within wetland areas are occurring within the study area. Given the lack of precedent for an agricultural wetland conversion project , this analysis does not estimate the number of future agricultural wetland conversion projects or the incremental impacts stemming from the additional administrative cost of addressing adverse modification during section 7 consultation for such projects. To the extent that future agricultural wetland conversion projects occur within the study area during the analysis timeframe, this analysis underestimates incremental costs of section 7 consultation.

4.4 MITIGATION BANK ESTABLISHMENT

117. This section considers potential incremental impacts associated with future mitigation bank establishment. Future mitigation bank establishment may require section 7 consultation triggered by the need for a section 404 permit. Mitigation bank establishment requires a 404 permit if wetland restoration activities are necessary as part of bank development (e.g., digging and grading wetland areas).[112] Mitigation bank establishment may also require section 7 consultation if it includes CTS translocation in order to repopulate the species within a mitigation bank area.

118. CTS mitigation is expected to be required for future development, transportation, and utility projects within the study area. Future development projects alone are forecast to require 920 acres of mitigation to offset unavoidable impacts to the CTS and its habitat (see Chapter 3). Currently available CTS mitigation credits are not expected to be sufficient to offset all future development, transportation, and utility projects in the study area.[113] Thus, additional CTS mitigation credits will need to be created in the form of new mitigation banks.

119. This report conservatively assumes that all new mitigation banks will be established in the study area and will require a section 404 permit for wetland restoration activities.[114]

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[110] Based on a review of the section 7 consultation history from 2004 to 2010.

[111] Personal communication with the San Francisco District of the U.S. Army Corps of Engineers, Regulatory Division, North Branch on July 6, 2010.

[112] Personal communication with Kevin Carinalli of the Carinalli-Todd Mitigation Bank on June 28, 2010.

[113] Personal communication with the Service on July 7, 2010.

[114] There are approximately 13,300 acres of land (3,560 acres within conservation areas and 9,770 acres outside conservation areas) within the study area considered suitable for mitigation bank establishment based on GIS analysis. Analysis excludes developable areas, areas within the Laguna de Santa Rosa 100-year floodplain, areas within urban growth boundaries, areas of unique farmland or farmland of local importance (considered suitable for viticulture), and areas within pre-existing mitigation banks, as unsuitable for mitigation bank establishment. Analysis relies on conservation area, mitigation bank, and floodplain data provided by the California Department of Fish and Game; Sonoma County Urban Growth data; California Farmland Mapping & Monitoring Program, Sonoma County Important Farmland dataset; and, local zoning data.

As such, all future mitigation bank establishment projects will be subject to section 7 consultation. Additionally, this analysis assumes that all future mitigation bank establishment will occur within may/likely to affect areas (as identified in Chapter 2) because all conservation areas are located within may/likely to affect areas. As described in the Programmatic, CTS mitigation areas must be located within conservation areas unless otherwise permitted by the Service and the California Department of Fish and Game.[115] As described in Chapter 2, any consultation within may/likely to affect areas would occur absent critical habitat. Incremental impacts, therefore, stem solely from the additional administrative costs of addressing adverse modification during consultations.

120. The Service anticipates only negligible administrative costs associated with addressing adverse modification during section 7 consultations on mitigation bank establishment projects as the establishment of a mitigation area will ultimately benefit the CTS even if temporary impacts to its habitat are likely.[116] Private party costs associated with establishing new mitigation banks (e.g., purchasing land and conducting wetland restoration) as well as costs associated with developing biological assessments for new banks as part of the section 7 consultation process are considered baseline as such costs would be incurred absent critical habitat. Mitigation bank establishment projects, therefore, are not expected to incur any incremental impacts following the designation of critical habitat for the CTS beyond negligible costs to the Service. As such, incremental impacts to future mitigation bank development are not quantified in this analysis.

4.5 REINITIATION OF THE PROGRAMMATIC CONSULTATION

121. Following the designation of critical habitat for the CTS, the Programmatic will be reinitiated to address the potential adverse modification of CTS critical habitat. The Service expects the Programmatic to be reinitiated within a year following the final designation of critical habitat.[117] All costs of reinitiating the Programmatic are incremental as reinitiation would not be necessary if not for the designation of critical habitat. The total present value cost of reinitiating the Programmatic is estimated to be $16,900 applying a seven percent discount rate.[118] The total cost of reinitiation is distributed across the six regions considered in this analysis according to the percent of the total critical habitat area each region represents. Exhibit 4-3 presents the present value costs of reinitiating the Programmatic by region applying a seven percent discount rate.

[115] U.S. Fish and Wildlife Service to U.S. Army Corps of Engineers. Programmatic Biological Opinion (Programmatic) for U.S. Army Corps of Engineers (Corps) Permitted Projects that May Affect California Tiger Salamander and Three Endangered Plant Species on the Santa Rosa Plain, California (Corps File Number 223420N). 81420-2008-F-0261. November 9, 2007.

[116] Written communication with the Service on October 19, 2010.

[117] *Ibid*.

[118] Reinitiation cost estimate comes directly from the administrative consultation costs reported in Exhibit 2-2 ($18,050 undiscounted).

EXHIBIT 4-3 COST OF REINITIATING THE PROGRAMMATIC BY REGION (2011 – 2035, 2010 DOLLARS, SEVEN PERCENT DISCOUNT RATE)

REGION	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
Cotati	$686	$59
Petaluma	$23	$2
Rohnert Park	$650	$56
Santa Rosa	$1,860	$160
Windsor	$571	$49
Outside UGB	$13,100	$1,120
Total	**$16,900**	**$1,450**

Sources:
1) Administrative consultation costs presented in Exhibit 2.2.
2) GIS analysis utilizing: proposed critical habitat boundaries provided by the Service on August 9, 2010; and, Sonoma County Urban Growth Boundaries.

Notes:
Values are rounded to three significant figures. Totals may not sum due to rounding.

CHAPTER 5 | ECONOMIC BENEFITS

122. The primary intended benefit of critical habitat is to support the conservation of threatened and endangered species, such as the CTS. Thus, attempts to develop monetary estimates of the benefits of this proposed critical habitat designation would focus on the public's willingness to pay to achieve the conservation benefits to the CTS resulting from this designation.

123. Quantification and monetization of species conservation benefits requires information on the incremental change in the probability of CTS conservation that is expected to result from the designation. As described in Chapters 3 and 4, costs associated with modifications to future projects are unlikely given protections stemming from compliance with section 404 of the CWA (i.e., CTS minimization and mitigation measures) and the lack of precedent for the Service to request additional CTS conservation measures beyond those implemented to comply with section 404. Thus, the designation is unlikely to materially increase the probability that the species will be conserved. Furthermore, the published valuation literature does not support monetization of such changes for this species.

124. Numerous published studies estimate individuals' willingness to pay to protect endangered species. The economic values reported in these studies reflect various groupings of benefit categories (including both use and non-use values). For example, these studies assess public willingness to pay for wildlife-viewing opportunities, for the option for seeing or experiencing the species in the future, to assure that the species will exist for future generations, and simply knowing a species exists, among other values. Unfortunately, this literature addresses a relatively narrow range of species and circumstances compared to the hundreds of species and habitats that are the focus of the Act. Specifically, existing studies focus almost exclusively on large mammal, bird, and fish species, and generally do not report values for incremental changes in species conservation. Importantly for this analysis, we are not aware of any published studies that estimate the value the public places on preserving the CTS.

125. Other benefits may also be realized through designation of critical habitat. For example, the public may hold a value for habitat conservation, beyond its willingness to pay for conservation of a specific species. Studies have been conducted that estimate the public's willingness to pay to preserve wilderness areas, for wildlife management and preservation programs, protection of open space and ecosystem maintenance. Again, designation of critical habitat for the CTS is unlikely to provide significant habitat and species protection above existing baseline protections, and any such change is highly uncertain. As such, estimation of any ancillary benefits is not feasible.

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APPENDIX A | SMALL BUSINESS ANALYSIS AND ENERGY IMPACTS ANALYSIS

91. This appendix considers the extent to which incremental impacts from critical habitat designation may be borne by small entities and the energy industry. The analysis presented in Section A.1 is conducted pursuant to the RFA as amended by SBREFA. Information for this analysis was gathered from the Small Business Administration (SBA), the Service, and from interviews with stakeholders contacted in the development of the economic analysis. The energy analysis in Section A.2 is conducted pursuant to Executive Order No. 13211.

92. The analyses of impacts to small entities and the energy industry rely on the estimated incremental impacts resulting from the proposed revised critical habitat designation. The incremental impacts of the rulemaking are most relevant for the small business and energy impacts analyses because they reflect costs that may be avoided or reduced based on decisions regarding the composition of the final rule. The only incremental impacts forecast in this analysis are administrative costs of section 7 consultation, as quantified by activity in Chapters 3 and 4.

A.1 SBREFA ANALYSIS

93. When a Federal agency proposes a regulation, the RFA requires the agency to prepare and make available for public comment an analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions as defined by the RFA).[119] No initial regulatory flexibility analysis is required if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the RFA to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have significant economic impact on a substantial number of small entities. To assist in this process, this appendix provides a screening level analysis of the potential for CTS critical habitat designation to affect small entities.

94. To ensure broad consideration of impacts on small entities, the Service has prepared this small business analysis without first making the threshold determination in the proposed rule regarding whether the proposed revised critical habitat designation could be certified as not having a significant economic impact on a substantial number of small entities. This small business analysis will therefore inform the Service's threshold determination.

[119] 5 U.S.C. § 601 et seq.

A.1.1 REQUIREMENTS OF SBREFA ANALYSIS

95. This analysis is intended to improve the Service's understanding of the potential effects of the proposed rule on small entities and to identify opportunities to minimize these impacts in the final rulemaking. The Act requires the Service to designate critical habitat for threatened and endangered species to the maximum extent prudent and determinable. Section 4(b)(2) of the Act requires that the Service designate critical habitat "on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impact, of specifying any particular areas as critical habitat." The Secretary's discretion is limited as (s)he may not exclude areas if so doing "will result in the extinction of the species."

96. Three types of small entities are defined in the RFA:

- **Small Business -** Section 601(3) of the RFA defines a small business as having the same meaning as small business concern under section 3 of the Small Business Act. This includes any firm that is independently owned and operated and is not dominant in its field of operation. The SBA has developed size standards to carry out the purposes of the Small Business Act, and those size standards can be found in 13 CFR 121.201. The size standards are matched to NAICS industries. The SBA definition of a small business applies to a firm's parent company and all affiliates as a single entity.
- **Small Governmental Jurisdiction -** Section 601(5) defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with a population of less than 50,000. Special districts may include those servicing irrigation, ports, parks and recreation, sanitation, drainage, soil and water conservation, road assessment, etc. When counties have populations greater than 50,000, those municipalities of fewer than 50,000 can be identified using population reports. Other types of small government entities are not as easily identified under this standard, as they are not typically classified by population.
- **Small Organization -** Section 601(4) defines a small organization as any not-for-profit enterprise that is independently owned and operated and not dominant in its field. Small organizations may include private hospitals, educational institutions, irrigation districts, public utilities, agricultural co-ops, etc.

97. The courts have held that the RFA/SBREFA requires Federal agencies to perform a regulatory flexibility analysis of forecast impacts to small entities that are directly regulated. In the case of *Mid-Tex Electric Cooperative, Inc., v. Federal Energy Regulatory Commission (FERC)*, FERC proposed regulations affecting the manner in which generating utilities incorporated construction work in progress in their rates. The generating utilities that expected to be regulated were large businesses; however, their customers -- transmitting utilities such as electric cooperatives -- included numerous small entities. In this case, the court agreed that FERC simply authorized large electric generators to pass these costs through to their transmitting and retail utility customers,

and FERC could therefore certify that small entities were not directly impacted within the definition of the RFA.[120]

98. Similarly, *American Trucking Associations, Inc. v. Environmental Protection Agency* (EPA) addressed a rulemaking in which EPA established a primary national ambient air quality standard for ozone and particulate matter.[121] The basis of EPA's RFA/SBREFA certification was that this standard did not directly regulate small entities; instead, small entities were indirectly regulated through the implementation of state plans that incorporated the standards. The court found that, while EPA imposed regulation on states, it did not have authority under this rule to impose regulations directly on small entities and therefore small entities were not directly impacted within the definition of the RFA.

99. The SBA in its guidance on how to comply with the RFA recognizes that consideration of indirectly affected small entities is not required by the RFA, but encourages agencies to perform a regulatory flexibility analysis even when the impacts of its regulation are indirect.[122] "If an agency can accomplish its statutory mission in a more cost-effective manner, the Office of Advocacy [of the SBA] believes that it is good public policy to do so. The only way an agency can determine this is if it does not certify regulations that it knows will have a significant impact on small entities even if the small entities are regulated by a delegation of authority from the Federal agency to some other governing body."[123]

100. The regulatory mechanism through which critical habitat protections are enforced is section 7 of the Act, which directly regulates only those activities carried out, funded, or permitted by a Federal agency. By definition, Federal agencies are not considered small entities, although the activities they may fund or permit may be proposed or carried out by small entities. Given the SBA guidance described above, this analysis considers the extent to which this designation could potentially affect small entities, regardless of whether these entities would be directly regulated by the Service through the proposed rule or by a delegation of impact from the directly regulated entity.

A.1.2 SUMMARY OF IMPACTS TO SMALL ENTITIES

101. This screening analysis focuses on small entities that may incur incremental impacts due to the designation of critical habitat. Potential incremental impacts depend on the presence of the CTS, existing conservation efforts (e.g., CTS minimization and mitigation related to the section 404 permit process), and the existence of a Federal nexus. This analysis uses the methodology outlined in Chapter 2 to identify and estimate incremental impacts. As described in Chapters 3 and 4 of this report, all incremental impacts quantified stem from the additional administrative costs of addressing adverse

[120] 773 F. 2d 327 (D.C. Cir. 1985).

[121] 175 F. 3d 1027, 1044 (D.C. Cir. 1999).

[122] Small Business Administration, Office of Advocacy. May 2003. A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act, pg. 20.

[123] *Ibid.*, pg. 21.

modification during future section 7 consultations. Small entities may participate in section 7 consultation as a third party (the primary consulting parties being the Service and the Federal action agency). It is therefore possible that the small entities may spend additional time considering critical habitat during section 7 consultation for the CTS. These incremental administrative costs of consultation borne by third parties are the subject of this SBREFA analysis. Additional incremental administrative costs of consultation borne by Federal action agencies and the Service are not relevant to this screening analysis as these entities (Federal agencies) are not small.

102. Chapters 3 and 4 of this analysis forecast consultations for development, transportation, and utility activities as follows.

- **Development.** Section 7 consultations for future development projects are expected to stem from the need for a section 404 permit pursuant to the CWA. Section 404 requires consultation if a project may affect a listed species.[124] The Corps is the consulting Federal agency on consultations for section 404 permits. Future consultations for 404 permits will also include third parties, such as private developers or county agencies. Private developers may be considered small entities if their annual income is not greater than $33.5 million. This analysis assumes that consultation costs will be borne by developers as an additional project expense, rather than by landowners who could experience consultation costs as a land value loss.[125]
- **Transportation.** As described in Section 4.1 of this report, incremental impacts to future transportation projects are forecast to be incurred by CALTRANS. CALTRANS, a State agency, does not meet the definition of a small entity.
- **Utility Activities.** There is only one section 7 consultation forecast to occur for utility activities within the analysis timeframe (Section 4.2). The forecast consultation is an intra-Service consultation for the approval of an HCP developed by PG&E. Administrative costs are limited to the Service in an intra-Service consultation as no other party is involved in the consultation process. Therefore, no incremental impacts to utility activities are expected to be borne by small entities.

Given that incremental impacts potentially incurred by small entities are limited to development, the remainder of this analysis focuses on this activity.

Development Impacts

[124] 40 CFR Part 230.75.

[125] If there is a large amount of land available for development outside of proposed critical habitat areas, incremental administrative costs of consultation may be borne by landowners rather than developers. Some landowners within the study area are expected qualify as small entities, however they are not addressed in this analysis. The assumption that incremental impacts will be borne by developers is applicable in this analysis given that the majority of forecast development is within urban growth boundaries where there a limited development alternatives outside of critical habitat. To the extent that incremental impacts are borne by landowners rather than developers, this analysis estimates the effects of incremental impacts to the wrong small businesses (i.e., small developers rather than small landowners).

103. As described in Section 3.1.2, roughly eight development projects are forecast to occur annually within the study area between 2011 and 2035. Only development projects within unlikely to affect or may/likely to affect areas (as identified in Chapter 2) are expected to require section 7 consultation due to the need for a section 404 permit. Of the eight total development projects per year, roughly 6.25 are forecast to occur within unlikely or may/likely to affect areas.

104. Incremental administrative costs of section 7 consultation vary depending on whether the project is located within unlikely to affect areas or within may/likely to affect areas. Within unlikely to affect areas, no consultation would be required absent critical habitat. Thus, incremental impacts are equal to the cost of a new formal consultation solely addressing adverse modification (the Service does not conduct a jeopardy analysis in unlikely to affect areas). Within may/likely to affect areas, section 7 consultation for the CTS would occur absent critical habitat. In this case, incremental impacts are equal to the additional administrative cost of addressing adverse modification in a formal consultation addressing jeopardy and adverse modification. As presented in Exhibit 3-11, 0.81 development projects are forecast to occur within unlikely to affect areas annually, while 5.43 development projects are forecast to occur within may/likely to affect areas.[126]

105. Applying: a) the third party cost of a formal consultation solely addressing adverse modification ($2,625 as described in Exhibit 2-4) to the number of forecast development projects within unlikely to affect areas; and, b) the third party costs of addressing adverse modification during a formal consultation addressing both jeopardy and adverse modification ($875 as described in Exhibit 2-4) to the number of forecast development projects within may/likely to affect areas; present value incremental impacts to third parties are estimated to be $77,200 or $6,630 in annualized impacts (applying a seven percent discount rate).

106. As identified in the section 7 consultation history, consultations for forecast development projects are expected to include local public agencies (e.g., school districts), local private developers, and relatively-large commercial entities. To the extent that forecast consultations for development projects include commercial entities exceeding the $33.5 million annual sales threshold, incremental administrative costs will not be borne by small entities. However, the majority of forecast consultations for development are expected to include local private developers, which may be small entities. In the past, development projects in the study area have included the construction of residential subdivisions as well as commercial office space.[127] Therefore, construction of buildings, including housing, industrial buildings, and commercial and institutional buildings, is

[126] U.S. Fish and Wildlife Service to Industrial Economics, Incorporated. August 4, 2010. "Comments on how the Draft Economic Analysis Should Estimate Incremental Costs for the California Tiger Salamander (*Ambystoma californiense*), Sonoma Distinct Population Segment, Re-proposed Critical Habitat Designation."

[127] Based on a review of the section 7 consultation history from 2004 to 2010.

identified as the most-applicable-industry to capture local private developers that may incur incremental administrative costs due to the designation of critical habitat.[128]

107. A Dun and Bradstreet search for building construction companies (NAICS code 236) within Sonoma County indicates that the total number of companies is 1,911 and of these 1,896 are considered small entities. Approximately 99 percent of all building construction companies in Sonoma County qualify as small entities.[129] Absent information on the specific third parties that may be involved in future development consultations, this analysis conservatively assumes that all of the entities involved in future consultation efforts are small land subdivision companies.

108. Annual impacts to the building construction industry ($6,630 applying a seven percent discount rate) are significantly less than the maximum annual revenues that could be generated by a single small building construction entity ($33.5 million). Of the 1,896 small building construction entities operating within Sonoma County, the number that may be involved in development projects subject to consultation for the CTS is unknown. The estimated annualized impact may be borne by one company or distributed across many. If all impacts are borne by a single small construction company, the estimated annualized impact would represent less than 0.1 percent of maximum total annual revenues.

A.2 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY

109. Pursuant to Executive Order No. 13211, "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use," issued May 18, 2001, Federal agencies must prepare and submit a "Statement of Energy Effects" for all "significant energy actions." The purpose of this requirement is to ensure that all Federal agencies "appropriately weigh and consider the effects of the Federal Government's regulations on the supply, distribution, and use of energy."[130]

110. The Office of Management and Budget provides guidance for implementing this Executive Order, outlining nine outcomes that may constitute "a significant adverse effect" when compared with the regulatory action under consideration:

- Reductions in crude oil supply in excess of 10,000 barrels per day;
- Reductions in fuel production in excess of 4,000 barrels per day;
- Reductions in coal production in excess of 5 million tons per year;

[128] U.S. Small Business Administration. 2008. Table of Small Business Size Standards Matched to North American Industry Classification System Codes. Accessed online at http://www.sba.gov/contractingopportunities/officials/size/index.html on September 14, 2010.

[129] Dialog search of File 516, Dun and Bradstreet, "Duns Market Identifiers," on September 14, 2010.

[130] Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance For Implementing E.O. 13211, M-01-27, Office of Management and Budget, July 13, 2001, http://www.whitehouse.gov/omb/memoranda/m01-27.html.

- Reductions in natural gas production in excess of 25 million thousand cubic feet per year;
- Reductions in electricity production in excess of 1 billion kilowatt-hours per year or in excess of 500 megawatts of installed capacity;
- Increases in energy use required by the regulatory action that exceed the thresholds above;
- Increases in the cost of energy production in excess of one percent;
- Increases in the cost of energy distribution in excess of one percent; or
- Other similarly adverse outcomes.[131]

As described in Chapter 4, incremental impacts to utilities are limited to the administrative cost of an intra-Service consultation. No third party is involved in the consultation process and thus utilities are not expected to experience incremental costs as a result of the designation. Therefore, the rule will not affect the production, distribution, or use of energy and none of the above criteria are relevant to this analysis.

[131] *Ibid*.

APPENDIX B | THREE PERCENT DISCOUNT RATE EXHIBITS

146. This appendix summarizes the costs of CTS conservation efforts quantified in Chapters 3 and 4 of this report applying an alternative real discount rate of three percent (the main text of the report applies a real discount rate of seven percent). This analysis employs standard discounting techniques to calculate the present value of economic impacts that are expected to occur at different points in time. Consistent with the main analysis, this appendix focuses on quantified estimates of economic impacts to development, transportation, and utility activities within the proposed revised critical habitat area as well as quantified costs of reinitiating the Programmatic.

147. Exhibit B-1 summarizes the distribution of estimated incremental economic impacts by region. The exhibits provide estimates of the present value and annualized impacts described in Chapters 3 and 4 of this report employing a three percent real discount rate. Exhibit B-1 presents overall incremental economic impacts by region applying a real discount rate of three percent. Exhibits B-2 through B-5 present estimated incremental economic impacts by subunit and economic activity applying a three percent discount rate. Finally, Exhibit B-6 presents overall incremental impacts by activity applying a three percent discount rate.

EXHIBIT B-1 FORECAST INCREMENTAL IMPACTS OF CALIFORNIA TIGER SALAMANDER (2011-2035, THREE PERCENT DISCOUNT RATE, 2010 DOLLARS)

REGION	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
Cotati	$22,700	$1,300
Petaluma	$14,300	$820
Rohnert Park	$33,700	$1,940
Santa Rosa	$311,000	$17,900
Windsor	$203,000	$11,700
Outside UGB	$117,000	$6,710
Total	**$702,000**	**$40,300**
Note: Totals may not sum due to rounding.		

EXHIBIT B-2 FORECAST INCREMENTAL IMPACTS OF CALIFORNIA TIGER SALAMANDER ON DEVELOPMENT ACTIVITIES (2011-2035, THREE PERCENT DISCOUNT RATE, 2010 DOLLARS)

REGION	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
Cotati	$15,300	$878
Petaluma	$12,400	$713
Rohnert Park	$31,200	$1,790
Santa Rosa	$303,000	$17,400
Windsor	$201,000	$11,500
Outside UGB	$96,600	$5,550
Total	**$659,000**	**$37,900**
Note: Totals may not sum due to rounding.		

EXHIBIT B-3 FORECAST INCREMENTAL IMPACTS OF CALIFORNIA TIGER SALAMANDER ON TRANSPORTATION ACTIVITIES (2011-2035, THREE PERCENT DISCOUNT RATE, 2010 DOLLARS)

REGION	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
Cotati	$6,470	$372
Petaluma	$1,620	$93
Rohnert Park	$1,620	$93
Santa Rosa	$6,060	$348
Windsor	$1,620	$93
Outside UGB	$6,470	$372
Total	**$23,900**	**$1,370**
Note: Totals may not sum due to rounding.		

EXHIBIT B-4 FORECAST INCREMENTAL IMPACTS OF CALIFORNIA TIGER SALAMANDER ON UTILITIES (2011-2035, THREE PERCENT DISCOUNT RATE, 2010 DOLLARS)

REGION	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
Cotati	$222	$13
Petaluma	$222	$13
Rohnert Park	$222	$13
Santa Rosa	$222	$13
Windsor	$222	$13
Outside UGB	$222	$13
Total	**$1,330**	**$77**
Note: Totals may not sum due to rounding.		

EXHIBIT B-5 FORECAST INCREMENTAL IMPACTS OF REINITIATING THE PROGRAMMATIC CONSULTATION (2011-2035, THREE PERCENT DISCOUNT RATE, 2010 DOLLARS)

REGION	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
Cotati	$713	$41
Petaluma	$24	$1
Rohnert Park	$676	$39
Santa Rosa	$1,930	$111
Windsor	$593	$34
Outside UGB	$13,600	$780
Total	**$17,500**	**$1,010**
Note: Totals may not sum due to rounding.		

EXHIBIT B-6 FORECAST INCREMENTAL IMPACTS OF CALIFORNIA TIGER SALAMANDER BY ACTIVITY (2011-2035, THREE PERCENT DISCOUNT RATE, 2010 DOLLARS)

ACTIVITY	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
Development	$659,000	$37,900
Transportation	$23,900	$1,370
Reinitiation of Programmatic	$17,500	$1,010
Utilities	$1,330	$77
Total	**$702,000**	**$40,300**
Note: Totals may not sum due to rounding.		

APPENDIX C | UNDISCOUNTED IMPACTS BY ECONOMIC ACTIVITY

148. This appendix summarizes undiscounted impacts by year for each economic activity and reinitiation of the Programmatic. These details are provided in accordance with OMB guidelines for developing benefit and cost estimates. OMB directs the analysis to: "include separate schedules of the monetized benefits and costs that show the type and timing of benefits and costs, and express the estimates in this table in constant, undiscounted dollars."[132]

149. Exhibit C-1 summarizes potential undiscounted incremental impacts to development activities (as described in Chapter 3). Exhibits C-2 and C-3 summarize potential undiscounted incremental impacts to transportation activities and utilities (as described in Chapter 4). Finally, Exhibit C-4 summarizes incremental impacts due to reinitiation of the Programmatic (as described in Chapter 4).

[132] Office of Management and Budget, Circular A-4, September 17, 2003, p. 18). The reference to "constant" dollars indicates that the effects of general price level inflation (the tendency of all prices to increase over time) should be removed through the use of an inflation adjustment index.

EXHIBIT C-1 UNDISCOUNTED INCREMENTAL IMPACTS TO DEVELOPMENT ACTIVITIES BY REGION, YEAR, AND IMPACT SOURCE (2011-2035, 2010 DOLLARS)

REGION	IMPACT	FREQUENCY	IMPACT SOURCE
Cotati	$878	Annual (2011 - 2035)	Administrative costs of section 7 consultation
Petaluma	$713		
Rohnert Park	$1,790		
Santa Rosa	$17,400		
Windsor	$11,500		
Outside UGB	$5,550		

EXHIBIT C-2 UNDISCOUNTED INCREMENTAL IMPACTS TO TRANSPORTATION ACTIVITIES BY REGION, YEAR, AND IMPACT SOURCE (2011-2035, 2010 DOLLARS)

REGION	IMPACT	FREQUENCY	IMPACT SOURCE
Cotati	$6,670	2011	Administrative costs of section 7 consultation
Petaluma	$1,670		
Rohnert Park	$1,670		
Santa Rosa	$1,670		
	$5,000		
Windsor	$1,670		
Outside UGB	$6,670		

EXHIBIT C-3 UNDISCOUNTED INCREMENTAL IMPACTS TO UTILITIES BY REGION, YEAR, AND IMPACT SOURCE (2011-2035, 2010 DOLLARS)

REGION	IMPACT	FREQUENCY	IMPACT SOURCE
Cotati	$229	2011	Administrative costs of section 7 consultation
Petaluma	$229		
Rohnert Park	$229		
Santa Rosa	$229		
Windsor	$229		
Outside UGB	$229		

EXHIBIT C-4 UNDISCOUNTED INCREMENTAL COSTS OF REINITIATING THE PROGRAMMATIC BY REGION, YEAR, AND IMPACT SOURCE (2011-2035, 2010 DOLLARS)

REGION	IMPACT	FREQUENCY	IMPACT SOURCE
Cotati	$734	2011	Administrative costs of section 7 consultation
Petaluma	$24		
Rohnert Park	$696		
Santa Rosa	$1,990		
Windsor	$611		
Outside UGB	$14,000		

APPENDIX D | INCREMENTAL MEMO

Comments on how the Draft Economic Analysis Should Estimate Incremental Costs for the California Tiger Salamander (*Ambystoma californiense*), Sonoma Distinct Population Segment, Re-proposed Critical Habitat Designation

August 4, 2010

The single unit of proposed critical habitat for the California tiger salamander, Sonoma Distinct Population Segment (Sonoma CTS), represents a habitat-based population distribution that is based on records of known occurrences for this species. The spatial extent of the single critical habitat unit is designed to include areas that represent the geographic distribution of the Sonoma CTS across its range. A jeopardy analysis for the Sonoma CTS would look at the magnitude of the project's impacts relevant to the population(s) across its range. Furthermore, the jeopardy analysis would focus on effects to the reproduction, numbers, or distribution of the species. An adverse modification analysis would focus on a project's impacts to the physical features (primary constituent elements (PCEs)), or other habitat characteristics in areas determined by the Secretary to be essential for the conservation of the Sonoma CTS, and analyze impacts to the capability of the critical habitat unit to maintain its conservation role and function for the Sonoma CTS.

The area proposed for the Sonoma CTS critical habitat unit provides for reproduction and growth of the species in an area of the Santa Rosa Plain that is bordered on the west by the generalized eastern boundary of the 100-year Laguna de Santa Rosa floodplain, on the south by Pepper Road northwest of Petaluma, on the east by the foothills, and on the north by Windsor Creek. Additional features that were used to refine the extent of the critical habitat unit included the 300-foot (91.5-meter) elevation contour line, urban in-filled areas of Santa Rosa and Rohnert Park, and location of specific soil types associated with the habitat used by the Sonoma CTS. Within the boundary, developed areas, such as lands covered by buildings, pavement, and other structures, are not included in the proposed critical habitat unit because they do not contain the PCEs needed by the Sonoma CTS to survive.

The Santa Rosa Plain and adjacent areas are characterized by vernal pools, seasonal wetlands, and associated grassland habitat. The critical habitat unit encompasses nine vernal pool complexes, each containing wetlands known to support breeding salamanders. Currently the salamander occurs on natural landscapes within the Santa Rosa Plain that retain one or more vernal pools or manmade stock ponds, areas with standing bodies of freshwater that remain inundated for at least 12 consecutive weeks during a year with average rainfall, and surrounding upland habitat.

Known breeding sites for the Sonoma CTS are restricted to two soil types. The Huichica-Wright-Zamora soil series/association is considered prime for Sonoma CTS breeding habitat because soil types hold water long enough for Sonoma CTS to breed, develop, and metamorphose before pools dry, while the Clear Lake-Reyes soils series/association is considered suitable to marginal for containing breeding habitat for the salamander. Other soil types in Sonoma County may be considered unsuitable breeding habitat because they are either well-drained and rocky, or comprise low lying tidelands and salt marsh habitat.

Adult Sonoma CTS move to ponded freshwater habitats for up to several weeks for breeding, and the resulting offspring reside in the ponds until they metamorphose in early summer. However, adult and juvenile Sonoma CTS reside most of the year in underground burrows within upland habitat. They depend on upland habitats containing refugia in the form of ground squirrel or gopher burrows, or other underground structures for their survival. Burrows provide essential protection from desiccation and heat, while also providing foraging opportunities and protection from predators. Sonoma CTS do not construct their own burrows, so they rely on the continuing presence of small mammal species that dig burrows of sufficient depth to provide adequate protection. Upland habitat is also important as dispersal habitat between areas with suitable upland and breeding habitat. Upland areas associated with water bodies are also an important source of nutrients for the aquatic habitat. Salamander larvae are predators that consume other aquatic organisms, and nutrients form the basis of the aquatic food chain upon which the salamander larvae depend.

California tiger salamanders, including the Sonoma CTS, live in a landscape formed by a Mediterranean climate. The landscape is characterized by temporal and spatial changes in habitat quality and quantity. During a period of abundant rainfall, most or all seasonal pools and ponds, may become suitable breeding habitat for adult California tiger salamanders. Conversely, habitat use may be drastically confined during periods of prolonged drought. Due to

this variability, the number of breeding adults and recruitment of juveniles into the populations can vary from year to year. During favorable years, California tiger salamanders can produce large numbers of dispersing young, potentially resulting in an increase in the number of occupied sites. In contrast, California tiger salamanders may temporarily disappear from breeding ponds during periods of extended drought. Therefore, it is essential to provide sites that can be recolonized by dispersing individuals (Semlitsch 2000, pp. 623, 624). Also the distribution of tiger salamanders within a habitat area may vary depending on habitat availability, environmental conditions, and number of potentially dispersing tiger salamanders. The essential features for the tiger salamander include both an aquatic and an upland component. Tiger salamanders are known to disperse between breeding aquatic habitat and non-breeding aquatic habitat as well as upland dispersal habitat to adjacent aquatic features. Dispersal habitat can be almost any type of habitat that provides open upland habitat with subsurface refugia and foraging opportunities. This includes native or nonnative grasslands, agriculture fields or pasture lands that have small mammal burrows, soil fissures, or other cover.

In designated critical habitat, consultations under section 7 of the Act include independent analyses for jeopardy and adverse modification. In general, to avoid adverse effects to Sonoma CTS, project proponents should avoid wetlands and upland habitat proximate to wetlands whenever feasible. Avoidance of wetland features will minimize or avoid adverse effects to potential breeding sites and also to upland habitat proximate to breeding. If avoidance is not feasible we work with project proponents to develop measures to minimize the effect of a project on the Sonoma CTS. Measures to minimize impacts to the Sonoma CTS could include a range of measures, including those described in pages 7 through 9 of the *Programmatic Biological Opinion (Programmatic) for U.S. Army Corps of Engineers (Corps) Permitted Projects that May Affect California Tiger Salamander and Three Endangered Plant Species on the Santa Rosa Plain, California (Corps File Number 223420N) (Service File Number 81420-2008-F-0261 (incorporated by reference and provided as an attachment).* Within the proposed critical habitat boundary, we primarily consult on activities that affect U.S. Army Corps of Engineers jurisdictional wetlands and the Sonoma CTS through use of the Programmatic. We expect the likelihood of adverse effects to the salamander to vary depending on the location within the proposed critical habitat unit. Therefore, consultation is generally guided by the map of likely effects that is included in the biological opinion (Enclosure 1). A discussion of the land designations covered in the biological opinion is included below and summarized in Table 1.

Table 1. Explanation of Land Designations in Enclosure 1

Color Code	Likelihood of Adverse Affects to CTS
Gray	unlikely to adversely affect CTS – developed lands, no consultation required, not Critical habitat
Yellow	unlikely to adversely affect CTS, no consultation required – Sonoma CTS are not known to persist; few development projects expected due to flooding
Green	likely to adversely affect CTS – lands expected to be occupied; project proponents will likely assume presence of CTS
Orange	likely to adversely affect CTS – lands expected to be occupied; project proponents will likely assume presence of CTS; however, few projects have been proposed here
Blue	may adversely affect CTS – lands could be occupied; project proponents will likely use surveys to determine presence of CTS
Blue; southeast portion	likely to adversely affect CTS – lands expected to be occupied; project proponents will likely assume presence of CTS
Purple	may adversely affect CTS – lands could be occupied; project proponents will likely use surveys to determine presence of CTS, few projects have been proposed here

Enclosure 1 includes six land designations, based on likelihood that Sonoma CTS, or one or more of three listed plant species, will occur in the land designation. Urban and hardened landscapes are color-coded as gray. Gray areas designate lands where no effects to the salamander will occur due to their developed status. This designation

generally represents the area that was not included in the proposed critical habitat, as described in the text of the proposed rule. In the southern portion of the proposed critical habitat unit, there is also an area inside the eastern boundary that is also color-coded gray, but is comprised of agricultural and general range lands. Surveys for CTS have been conducted on two parcels within this area, and no salamanders have been detected. Although we currently do not consult on effects to the Sonoma CTS in this area, we would expect to consult on critical habitat in this area. However, we currently expect that the likelihood of an adverse modification determination in this area would be low. Federal nexus in this area is likely to be limited due to the limited occurrence of aquatic features.

Lands designated by the color yellow primarily represent lands that are low-lying and within a 100-year floodplain subject to periodic flooding, where Sonoma CTS are not known to persist. Based on current information, we do not expect take to occur within this designation, and no consultation is required. Because this area is subject to flooding, we generally expect few projects within this designation. Most of this designation is outside the proposed critical habitat boundary, but small areas occur inside the boundary.

Within the green-colored land designation, we expect the areas to be occupied so that the likelihood of adverse effects to Sonoma CTS is high. Consultation is required. If applicants complete two years of surveys under the survey guidance and no salamanders are found, we would generally determine that no take would occur. However, given the high likelihood of presence in this area, we estimate that around 85 percent of applicants assume that Sonoma CTS are present. We expect the same conditions to apply in the orange-colored land designations due to the high likelihood that Sonoma CTS are present within the designation. However, within the orange designation there are few projects that have been proposed. Although the reasons that few projects have been proposed here are not clear, most of the designation is outside of the urban growth boundary.

Within the blue-colored land designation, projects may adversely affect the Sonoma CTS, and consultation is required. In this designation, project proponents will generally most often use surveys to determine presence of salamanders. Where no salamanders are located, we would generally determine that no take would occur. Due to a recent new discovery of Sonoma CTS breeding within the blue-colored area located in the southeast portion of the Santa Rosa Plain (See Enclosure 1), we would expect that most project proponents in this area would assume presence of salamanders. Within the northerly blue area we estimate the likelihood that project proponents will conduct surveys will vary from low to high based on proximity of project site to known Sonoma CTS locations, connectivity with breeding habitat, and on past history of a site. Therefore we are unable to provide a quantitative probability of either conducting surveys in the area as a whole or on the probability of finding salamanders during surveys. Past surveys in the northerly blue areas have not detected salamanders; however, the same was true in the eastern blue area until this past year when a substantial breeding locality was identified there by a survey, thereby changing our expectations for that area.

Finally, within the purple-colored land designation, we would expect the same circumstances as in the bulk of the blue designation. We have had few projects proposed within the purple-colored land designation and therefore are unable to provide quantitative estimates of proportion of either surveys or positive survey findings. Although the reasons that few projects have been proposed here are not clear, most of the designation is outside of the urban growth boundary.

As indicated in the preceding paragraphs, surveys may be used to determine presence of the Sonoma CTS. However, project applicants frequently choose to assume presence because surveys to determine salamander presence do not always successfully detect individuals in a given area, even when the habitat is occupied by a Sonoma CTS population. Due to the high survey costs, project proponents often find it more expedient to assume presence where the likelihood of presence is high.

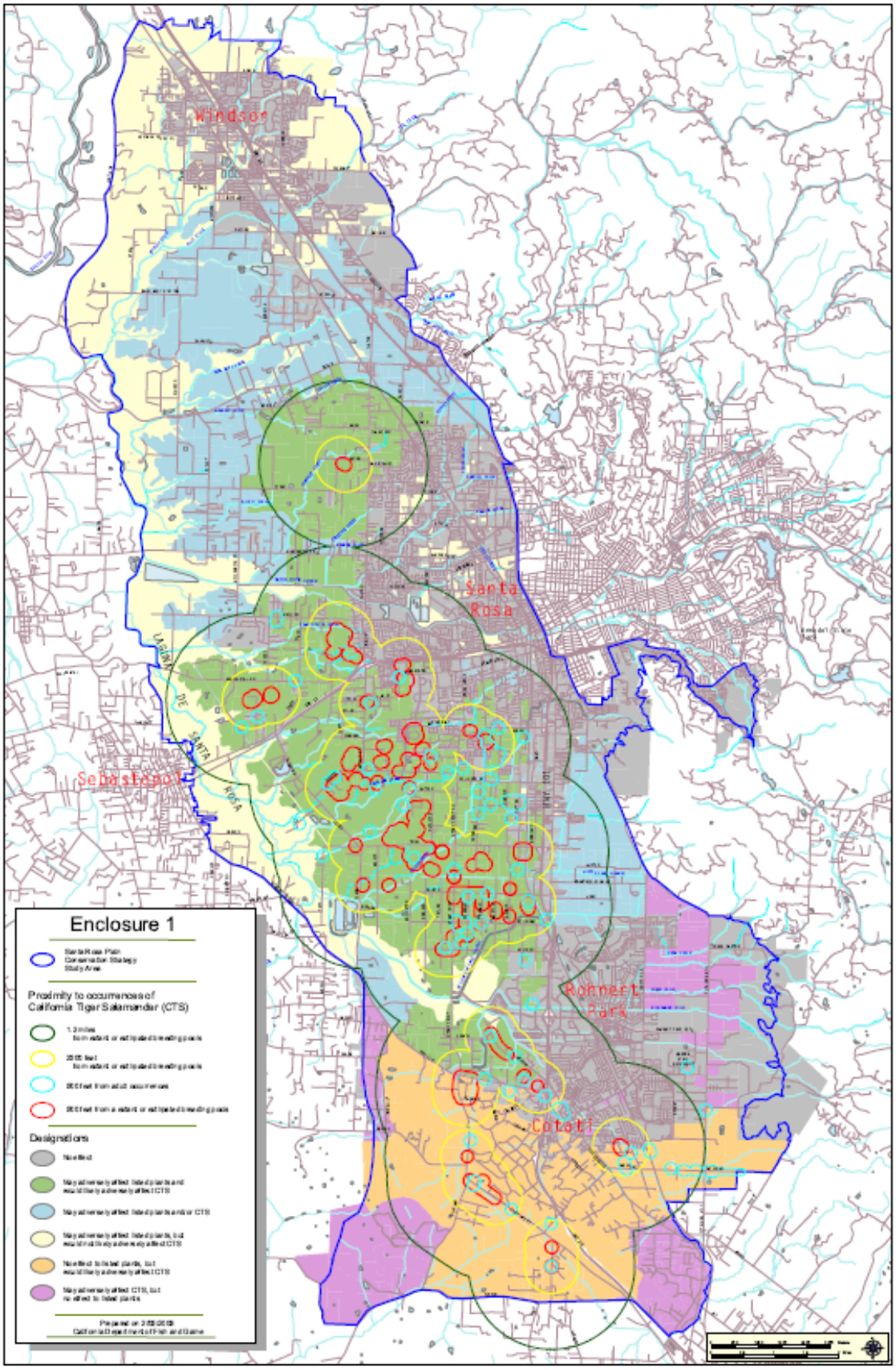
In consultations on projects where surveys detect tiger salamanders or where presence is assumed, a determination of adverse modification would likely be coincident to a jeopardy determination for the same action because we typically estimate take for this species in terms of acres of aquatic and upland occupied habitat. The typical project proposal is a development project where the impact to individuals is from habitat conversion. In such cases, project descriptions that are modified to minimize impacts to individuals will often also minimize impacts to the critical habitat, even when a portion of the salamanders have been translocated. For these projects, it is not possible to quantify the difference between measures implemented solely to minimize impacts to individuals from those implemented to minimize impacts to the critical habitat. As a result, potential economic impacts from conservation

efforts that may be necessary to avoid adverse modification of critical habitat under these circumstances are considered co-extensive with the impacts of the California tiger salamander listing and, for the purposes of the economic analysis, should be considered to be baseline costs. Therefore, the incremental costs in these consultations will likely be limited to administrative costs.

In consultations on projects where surveys do not detect California tiger salamander presence or that are associated with upland dispersal habitat areas that are not likely to be used by the tiger salamander, there may be additional incremental costs attributable to the designation of critical habitat beyond administrative costs. If the species is determined to be absent within a project footprint, the Service will still need to analyze any effects to aquatic or upland features (PCEs) within designated critical habitat regardless of survey results. Under these circumstances, it is possible to differentiate between measures implemented to minimize any such impacts to underlying habitat characteristics (PCEs) and measures implemented to minimize impacts to individuals and to avoid jeopardy to the species range-wide. Of particular concern when analyzing impacts to the PCEs would be location of a project within a critical habitat unit. Projects that (1) impact aquatic features essential for the successful reproduction of the species; (2) sever or fragment a core occurrence complex; or (3) affect adjacent and accessible upland or accessible dispersal habitat; or (4) reduce or eliminate small mammal burrows will all negatively impact the PCEs. An action may be likely to result in adverse modification if the impacts decrease the value of the critical habitat unit to provide for survival and recovery of the Sonoma CTS.

If we determine that an adverse modification finding may be likely, we would suggest changes to the project or reasonable and prudent alternatives to eliminate or reduce the impacts. These alternatives would require 1) modifying the development project such that a lower level of land use would occur; 2) relocating the project to avoid suitable wetland areas and associated upland areas.

In sum, although the outcomes of individual consultations under section 7 of the ESA will vary, we believe a reasonable method for determining the potential incremental impacts of the proposed critical habitat designation is to refer to land designations that are delineated in Enclosure 1 and to information for each designation above to determine general consultation requirements and outcomes within the critical habitat unit. Furthermore, assume that where project surveys do not detect Sonoma CTS, and take of other listed species is not reasonably likely to occur, potential impacts to projects are attributable to the designation of critical habitat.


Windsor
Santa Rosa
Sebastopol
Rohnert Park
Cotati
Enclosure 1
Proximity to occurrences of California Tiger Salamander (CTS)
Designations